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By-Miller, Elwood E., Director
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This project had a two-fold objective, namely to record on film aspects of a significant period in the history of education in the United States which had been reported almost entirely in print heretofore, and to organize and structure this information so as to link theory with practice, to the improvement of instruction generally when used in teacher education programs. The first part of the project included a national conference on cartridged films in February 1967, and is fully documented in this report. The second part, based on the findings of the first, was concerned with an intensive investigation of the single concept film idea, namely 'a short segment of film with a small, discrete, and describable instructional content'. The problem was to develop 'practicable systems for the selection, storage, maintenance, retrieval, distribution, and projection of film clips (single-concept, closed-loop films) from existing 16mm instructional films'. This report states the problem and purpose of the project, and discusses its methods, results, conclusions, recommendations and projections. (GO)

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FINAL REPORT
CONTRACT NUMBER OE-4-16-030

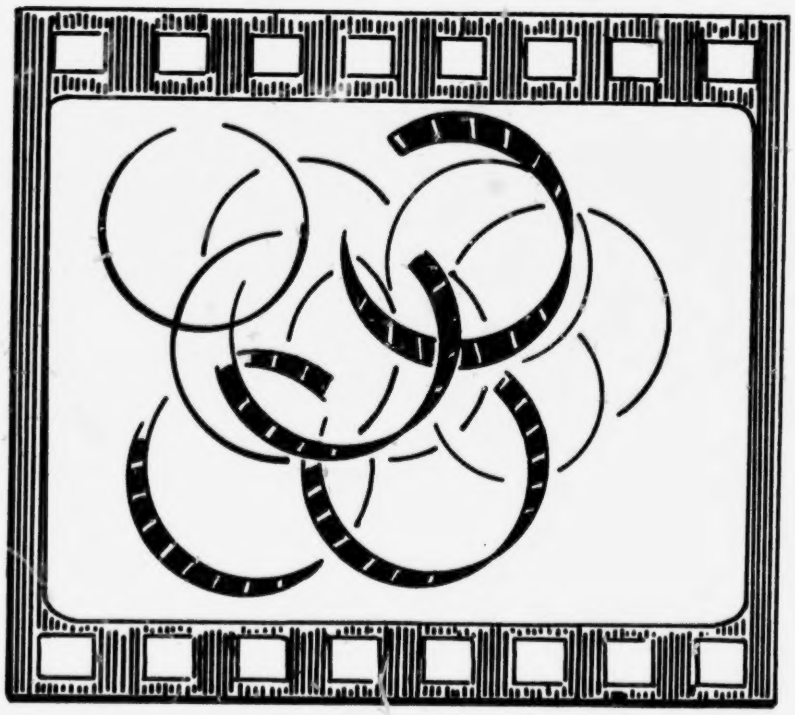
The Michigan State University

SINGLE CONCEPT FILM CLIP PROJECT

Part I

Report On The
NATIONAL CONFERENCE ON CARTRIDGED FILMS
February 22, 23, and 24, 1967

JUNE 1, 1967



U.S. Department of
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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

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SINGLE CONCEPT FILM CLIP PROJECT

Part I

A report on the
National Conference on Cartridged Films,
held at Michigan State University on
February 22, 23, and 24, 1967.

OE-4-16-030

Dr. Elwood E. Miller, Project Director
and Conference Chairman

June 1, 1967

The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

MICHIGAN STATE UNIVERSITY

East Lansing, Michigan

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FOREWARD AND ACKNOWLEDGMENTS

Final reports on the Single Concept Film Clip Project have been issued in two sections. Section One is the report on the NATIONAL CONFERENCE ON CARTRIDGED FILMS held on the Michigan State University Campus February 22, 23, and 24, 1967. Part Two is the final report of the project, incorporating the description of procedures, the findings, a description of the computer information system and suggestions for further research.

THE STUDY STAFF

Director: July 1, 1964 through June 30, 1965
Dr. James L. Page

Director: July 1, 1965 through June 30, 1967
Dr. Elwood E. Miller

Project Associates:
- Dr. Castelle Gentry (1964-65)
- Mr. Charles G. Bollmann (1965-67)
- Mr. Dennis Jaroh (1966-67)

Advisory Committee:
- Dr. Charles F. Schuller, Chairman
- Dr. John M. Mason
- Dr. T. Wayne Taylor
- Dr. Julian R. Brandou
- Dr. Horace C. Hartsell
- Dr. Lawrence M. Sommers
- Dr. John A. Ramsey
- Dr. James L. Page
- Professor Edward P. McCoy

Staff Specialists:
- Dr. Lloyd Trinklein
- Mrs. Ardith Hanna
- Miss Joy Klug
- Mr. David Jones

THE PRELIMINARY PAPERS

The Conference Planning Committee decided to request the preparation of three preliminary papers to send to the participants thirty days ahead of the meeting. The strategy was to prepare the delegates for the discourse that was to follow, in order to get the discussion to the "heart of the matter" in as short a time as possible. The following three papers were prepared specifically for the National Conference on Cartridged Films, reprinted and sent to the Delegates in late January, 1967.

CHAPTER I
INTRODUCTION

THE NATIONAL CONFERENCE ON CARTRIDGED FILMS

During the course of the first two years devoted to the investigation of single concept films and their sources at Michigan State University, it became apparent that a national meeting of some type was necessary in order to fulfill many of the objectives and some of the functions identified by the staff members of Michigan State. As a result, one of the major reasons for asking for a one-year continuance of the Project, was to plan and execute such a conference to be held on the Michigan State campus early in the 1967 calendar year.

It seemed to the staff of the Project that the major dimensions of a National Conference should be somewhat broader than just those of single concept films. True, the single concept movement first triggered the need for the conference and yet the staff had arrived at an important conclusion by the time the conference was planned. The true value of the single concept film perhaps was as much in the cartridging of the films as it was in the nature of the films themselves. And so plans were formulated for sponsoring a "National Conference on Cartridged Films" both of the single concept and more traditional variety to be held at Michigan State University during the one-year project extension. The Conference was held in February of 1967.

One of the major functions of the Conference was to disseminate information about the findings of the Single Concept Film Project at Michigan State University under the financial sponsorship of the U.S. Office of Education. Therefore, the first part of the Conference was devoted to just such a report. Furthermore, it was felt that a serious study was needed in the area of standards so far as the emerging 8mm film world was concerned. So a second major function of the Conference was a serious look at the standards problem as it related to both single concept and other types of cartridged films.

Therefore, the Conference was designed to serve the dual purpose of formulating an intensive dialogue on single concept films and the film standards situation, as well as serving as a vehicle for dissemination of information and about the investigation at Michigan State.

The selection of participants by the Planning Committee was divided in two general categories. The first category included representatives from the American business and industrial community. They included in roughly equal numbers four different groups. The first were representatives of the film production companies who are concerned with making films for the educational market. Many of these film producers also produce single concept films in the 8mm or the super 8mm format for marketing to schools and universities. A second group invited to send representatives, were the manufacturers of equipment for use in retrieving such filmed information from single concept and other cartridged films. Invitations were issued to all of the major equipment manufacturers, whether or not they were presently engaged in making equipment specifically for this field. Nearly all of the manufacturers responded and were represented at the meeting. A third group represented at the Conference were the educational systems or knowledge industry representatives. These are some of the newly emerging "systems" people who are concerned with both hardware and software so far as marketing educational packages are concerned. Several people were present from these newly emerging American corporates structures. A fourth group represented were the film laboratory interests who have a serious concern in the problems of standardization as far as 8mm release print films are concerned.

The second general category of participants invited to the National Conference on Cartridged Films were educators. These could be subdivided into two general groups. The first were Michigan State University affiliated staff and professional people; many of whom had worked on the Single Concept Film Clip Project during part or all of its life. Others had served on the Advisory Committee of the Single Concept Film Clip Project. Certain members of the Michigan State Audiovisual and Instructional Media staff who were familiar with the work were also in attendance.

The second general group of educators, representing a larger number, were invited specifically from outside of the Michigan State group. These included outstanding educators in the audiovisual communications field, including men of national stature in the educational technology field. Many were men who had a rich background of experience in the audiovisual field and who obviously would have substantial contributions to make. Others invited from all over the country included educators who were known for their work either in the 8mm film field or in the single concept production field. Certain officers and representatives of the Department of Audiovisual Instruction as well as the Society for Motion Picture and Television Engineers were invited to attend. The Planning Committee was particularly interested in having in attendance representatives of these groups who were serving on Standards Committee. Such representation was present.

The structure of the Conference itself, although formally planned in written form, nevertheless, was organized loosely enough to enable the conferees to go "off in tangential directions" when they felt that it was important or necessary to do so. The Planning Committee, under the direction of Dr. Charles Schuller, Project Chairman, and Dr. Elwood Miller, Project Director, formulated a rather careful 3-day program. The conference plan included a framework within which the Conferees could work, but not a limiting framework in terms of preventing their discourse upon subjects that might not have been predicted by the Planning Committee.

It is the opinion of the Single Concept staff that the various parts of the framework were well explored by the delegates and that the material was very adequately covered. The following is a collection of papers prepared for the National Conference; presented at the National Conference and resulting from work done at the National Conference. Each author's paper is identified and the Michigan State staff wishes to express its appreciation for the splendid and time-consuming work done by the many people who assisted in the preparation of the several reports.

CHAPTER II

MODULAR DESIGN FOR A SERIES OF FILMS ON COMMUNICATION THEORY AND THE NEW EDUCATIONAL MEDIA FOR USE IN TEACHER EDUCATION

Robert W. Wagner

In 1962, the belief that a series of films reporting contemporary developments in instructional technology might effectively help link research and classroom practice, generated a contract between the Ohio State University and the U.S. Office of Education under the project title: "A Series of Motion Picture Documents on Communication Theory and the New Educational Media." (1) The result was a period of audience research involving teacher's information and attitudes regarding instructional technology; coast-to-coast filming of innovative media-centered educational programs and first-hand comments by teachers, researchers, theorists, and educational administrators on the impact of media on education; continual testing of film segments during the course of production, and, by the end of 1966, a completed repertoire of 4 1/2 hours of films for teacher education and a modular design which is the focus of this paper.

Objectives

Initially, the objective was to get down on film aspects of a significant period in the history of education in the U.S. which had been reported almost entirely in print form up to this time. It was obvious that such material would have considerable historic value, including the images of certain pioneers in the field, innovative programs in schools and colleges, and a sampling of seminal research in communication and instructional technology heretofore reported only on paper.

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(1) The research reported herein was performed pursuant to a contract with the Office of Education, U.S. Department of Health, Education, and Welfare (Project No. B-131-A, Contract No. OE-3-16-020). Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgement in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

A second, and much more difficult objective was to organize and structure this information in such a way that it would usefully link theory and practice and contribute effectively to the improvement of instruction when used in teacher education programs. During the course of the project the thinking of the principal investigator was strongly influenced by the thesis of Gage and others to the effect that theories of learning will have greater application in education when they are transformed into theories of teaching.(2)

An Instructor-Centered Film Concept

While the ultimate viewers of the films, therefore, are students in teachers' colleges and universities, public school teachers in service, college students in communications-oriented or related fields such as sociology, psychology, public opinion, speech, radio, television, film, industrial and military training programs, and media institutes, seminars, workshops, and the like, the specific users of the films are considered to be the teachers who stand between the producers of communications research and theory on the one hand, and consumers of this research on the other. The films are, therefore, developed primarily for use by instructors in teachers' colleges; audiovisual specialists; and those in media institutes or seminars responsible for courses in communication theory, curriculum, media research, production or theory. A second group of users is envisioned as teachers in the fields of sociology, journalism, psychology, public opinion, business and personnel management, school administration, and other areas requiring communication insight. This would include instructors in industry and government responsible for workshops and training courses in communication and information dissemination; for public relations personnel; military training programs; or for those preparing to work with personnel in inter-community or inter-cultural programs such as Peace Corps, Vista, Headstart, and others.

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(2) Gage, N.L. "Theories of Teaching," Chap. XI, Theories of Learning and Instruction, the 63rd Yearbook of the National Society for the Study of Education, The University of Chicago Press, Chicago, Ill., 1964, pp. 268-285.

The project staff, in producing this series of films, had to be both structure-conscious and content-conscious. The attempt was to develop a design which would be not only an effective and comprehensive representation of developments in the new media of education, but also a collection and organization of flexible film materials deliberately intended to extend and enrich the possibilities for instructor-effectiveness. The theory is simply that instructional films (and other materials) should have the primary user (i.e. the instructor) in mind as well as the ultimate or so-called "target" audience.

The specific nature of the ultimate audience for any message today is more difficult to define than it has been in the past because even in formal educational settings, there is a wider range of experiences, a greater variety of groupings, and a larger number of individualized objectives at which the somewhat remote producer of instructional materials must aim.

The person who can most precisely define the immediate "target audience," its purposes, its needs, and the specific instructional objectives involved is the teacher himself. If we accept the idea that the best way to get learning theory into educational practice is through a transformation of principles of learning into principles of teaching, then an important contribution of the professional educational communicator would be to place in the hands of teacher a collection or repertoire of rich, provocative material, suffused with suggestibility, and designed for maximum utilization by the teacher himself.

Description of Films

Using a space-age analogy, the films in the series are referred to as a "Galaxy" of motion pictures. At the heart of the Galaxy are four major or "Planetary" films, each built around a major aspect of communication.

The first theme was "The Information Explosion." Its purpose was to build meaning into this concept in terms of how it affected the teacher, the learner, and the conditions of modern life itself. Here we had the cooperation of Edgar Dale, Wilbur Schramm, Gilbert Seldes, Marshall McLuhan, I. Keith Tyler and others whose attention had been given to this subject for some time.

The theme for the second film was "Communication Theory." Here the objective was to give the teacher the "geography" of communication beginning with the simple Lasswell model and elaborating and enriching the concept through examples of communication events from simulation to real school situations. Advice here came from George Gerbner, and also from Lawrence Stolurow, Donald Bitzer, Bert Kersh, Franklin Knower and others.

"Perception and Communication" was the theme of the third film with an emphasis both on theory and practice. Kenneth Norberg is the major consultant along with psychologists James Gibson and Hadley Cantril. This proved, and is proving the most difficult film to do without resorting to cliche and stereotyped material on this subject.

The fourth film has to do directly with "Teacher and Technology" and the application of these to educational systems. Here, James Finn, Charles Hoban, Jr., Sidney Pressey, Edgar Dale, and others were consulted.

Each Planetary film is composed of a number of different sequences designed to be used independently. These sequences 21 in all - are designed as "Asteroid" films (See Chart I).

The Galaxy also includes five "Satellite" films produced as spin-off in the course of the main production. These are:

1. The Communications Revolution. This is a 20-minute discussion film with Gilbert Seldes, Edgar Dale, Marshall McLuhan, and I. Keith Tyler.

2. Communications Conference. A 25-minute discussion film with James Finn, George Gerbner, Edgar Dale, Franklin Knower, Charles Hoban, Jr., and Kenneth Norberg.

3. Teaching Machines and Sidney Pressey is a 17-minute documentary on a personality and a philosophy.

4. Teacher-Centered Television is a 15-minute kinescope on the use of closed-circuit-television produced for and by the Air Force Academy, and made available by the Air Force as a Satellite in this project.

5. Music Research. This is a 17-minute report film produced for the Music Educators Conference under a grant from the U.S. Office of Education, describing experiments in teaching basic music skills through programmed instruction at the Ohio State University and at the Leslie Ellis School in Cambridge, Massachusetts, with a statement by B.F. Skinner.

All of these film forms comprising the Galaxy have been coded and arranged in such a way that, together with a utilization manual, parts of which are included here, utilization possibilities are amplified, longevity of the material extended, and the total investment most effectively amortized.

The Galaxy was conceived as a systematic exploration of four themes fundamental to any study of communication and the use of media in education. The "package" however, was also designed to be broken down and reassembled by those instructors whose course program is varied, and whose students are increasingly specialized in interests, or advanced in knowledge so that entirely new combinations of ideas or concepts may be presented by juxtaposing individual segments of the larger films. There is an obvious and rather close parallel between this filmic structure and Gagne's concept of hierarchy of behavioral repertoires.(3)

The structure of the Planetary films makes it possible to serve two seemingly opposite ends of the educational "log." On the one hand, they present a logically programmed presentation on communication theory and instructional media. On the other, they are composed of smaller but discretely designed segments from which the able teacher in the field of communication may choose, cafeteria-style, to serve his own special instructional requirements.

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(3) Gagne, Robert M. "The Acquisition of Knowledge," cited by John P. DeCecco (ed.) Educational Technology (New York: Holt, Rinehart, and Winston, 1965), pp. 115-131.

The teacher may assemble film clips from one or more Planetary films, and actually structure a film of his own. This design puts the teacher in control of the utilization situation. He is free to use the films as systematized packages, or he may create his own "branching" system to meet the immediate needs as he sees them. This is probably the first time that a high degree of flexible utilization has deliberately been built into the production of filmed materials to the extent that the teacher is expected and encouraged to be in control of the material to the point of physically altering the original content and adapting and rearranging it to meet the needs of the target audience and his own instructional objectives beyond those originally intended by the producer.

The Asteroid films are both short and episodic, and when used individually, do not impose a strong structure on the user, or the viewer. When used as part of the Planetary film, each Asteroid builds on the preceding Asteroid, sophisticating and elaborating the theme of the Planetary film. Each Planetary film begins with the more concrete and immediate examples or Asteroids and builds to the more abstract and futuristic sequences.

The Satellite films, in the same way, are "open-ended," leaving conclusions to the consideration of the instructor and the student of educational communication--placing the burden of "discovery" upon them.

The skeletal design of the Galaxy, then, is that:

The Planetary Films:

1. Present four major, common themes of any consideration of communication and education.

2. Present four major protagonists (Dale, Gerbner, Norberg, Finn) without making it "their film."

3. Present a reasonable "package" or core-material for a study of communication and education.

4. Present a realistic film document on the state of the art as it exists today told by the people who lived in the situation.

5. Are composed of a series of independent, yet related sequences arranged to build the major idea beginning with the more concrete examples and moving to progressively more sophisticated development of the same basic idea through more complex examples.

6. Bring the theme progressively closer to the classroom teacher with each sequence, the final Asteroid in each being the most specific applications of communication theory to practice.

The Asteroid Films:

1. Are designed so they may be used independently to document a major idea about communication theory; the so-called new media of education; a media-mediated teaching-learning situation; or a professional point of view.

2. Deal with specific information, but at the same time a degree of ambiguity has been deliberately built into each sequence. The basic information has been provided, but much more is suggested than stated in most Asteroids.

3. Are coded with identification imprinted along the edge of each, so that they may be easily and quickly located in the Planetary film; removed; and replaced in their original location.

4. Are varied stylistically, ranging from animation to dramatic dialogue--technique being dictated by content and purpose--not by traditional film form.

The Satellite Films:

1. Are composed of two discussion films (Communications Conference and Communications Revolution); a kinescope recording (Teacher Centered Television); a two-part research document, each of which may be used separately as an Asteroid (Music Research); and a film document on an historical phase of instructional technology (Teaching Machines and Sidney Pressey).

2. Provide background in depth for ideas suggested in the Planetary films, but at the same time are largely "open-ended."

3. Are "spin off" materials developed during the course of major production, in some cases testing production theories which were later, in some cases, put into practice in producing the Planetary films (e.g., the discussion films were in part "screen tests" to test lighting, voice qualities, and camera angles on protagonists who later appear in the major films; the film on music research was in part a test of the feasibility of composing a film from two essentially independent but related case histories in what later became the Asteroid idea).

4. May be used as conventional films, but have a special life and significance when seen in relation to the Galaxy from which they originated, and to the major ideas to which they owe their being. They are likely to be of most value when viewed as part of the package.

The advantages of this modular design appear to be considerable, including at least the following:

1. Each idea may be developed in a filmic style most appropriate for the content, rather than being confined to a single

FIGURE I: PART A
DESIGN OF PLANETARY FILMS BY ASTEROIDS

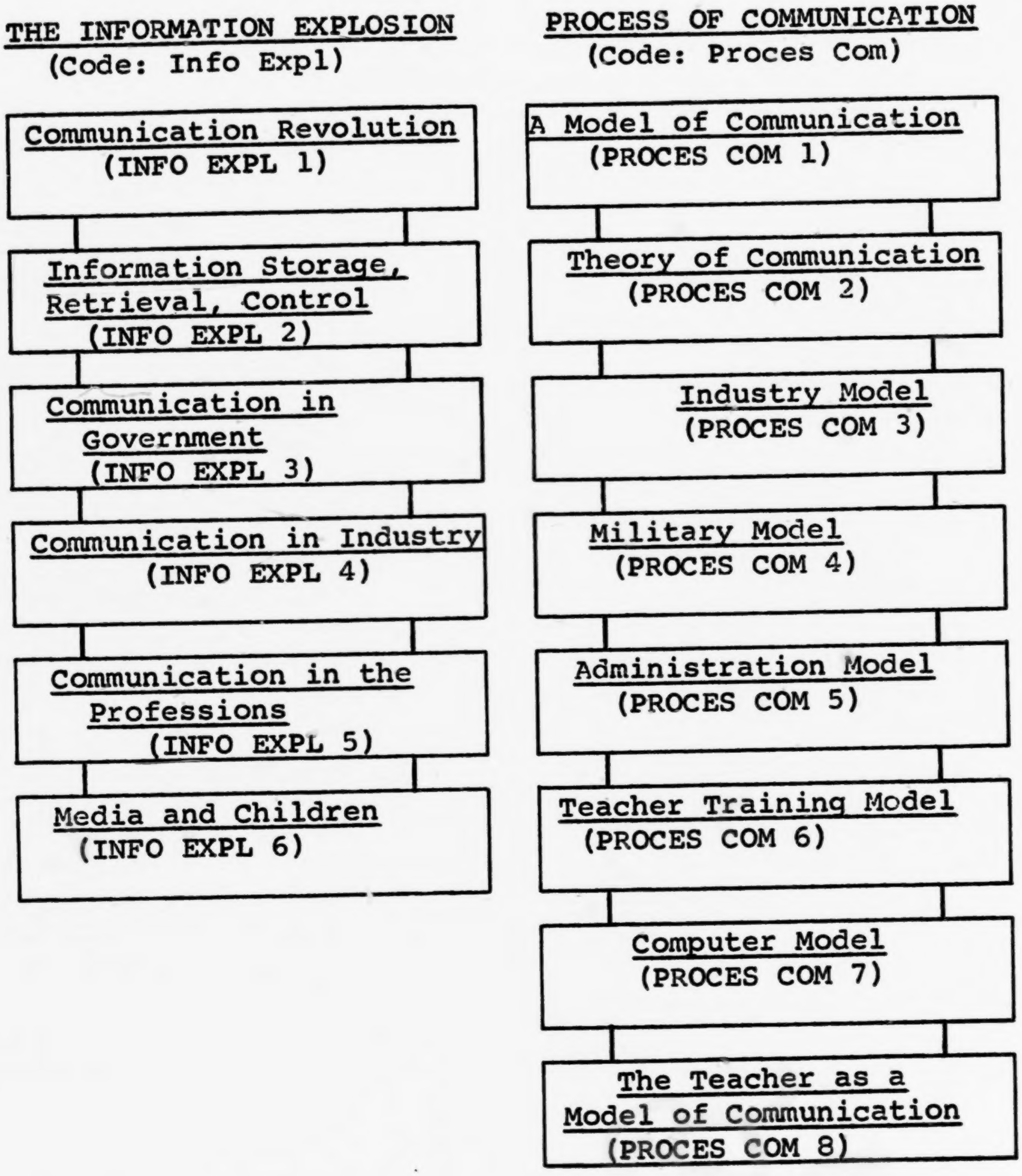
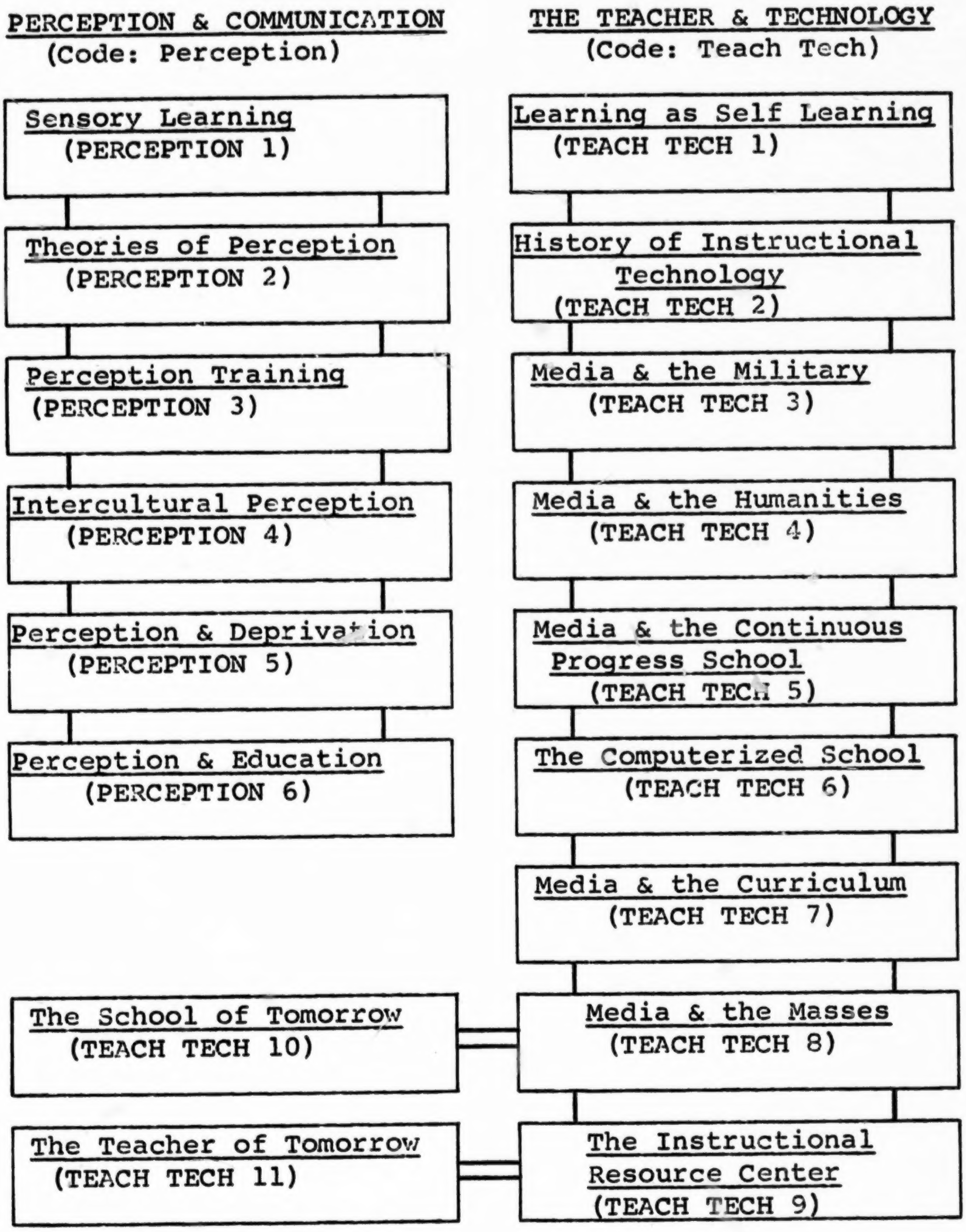

THE INFORMATION EXPLOSION
(Code: Info Expl)
Communication Revolution
(INFO EXPL 1)
Information Storage, Retrieval, Control
(INFO EXPL 2)
Communication in Government
(INFO EXPL 3)
Communication in Industry
(INFO EXPL 4)
Communication in the Professions
(INFO EXPL 5)
Media and Children
(INFO EXPL 6)
PROCESS OF COMMUNICATION
(Code: Proces Com)
A Model of Communication
(PROCES COM 1)
Theory of Communication
(PROCES COM 2)
Industry Model
(PROCES COM 3)
Military Model
(PROCES COM 4)
Administration Model
(PROCES COM 5)
Teacher Training Model
(PROCES COM 6)
Computer Model
(PROCES COM 7)
The Teacher as a Model of Communication
(PROCES COM 8)

FIGURE I: PART B
DESIGN OF PLANETARY FILMS BY ASTEROIDS


PERCEPTION & COMMUNICATION
(Code: Perception)
THE TEACHER & TECHNOLOGY
(Code: Teach Tech)
Sensory Learning (PERCEPTION 1)
Theories of Perception (PERCEPTION 2)
Perception Training (PERCEPTION 3)
Intercultural Perception (PERCEPTION 4)
Perception & Deprivation (PERCEPTION 5)
Perception & Education (PERCEPTION 6)
Learning as Self Learning (TEACH TECH 1)
History of Instructional Technology (TEACH TECH 2)
Media & the Military (TEACH TECH 3)
Media & the Humanities (TEACH TECH 4)
Media & the Continuous Progress School (TEACH TECH 5)
The Computerized School (TEACH TECH 6)
Media & the Curriculum (TEACH TECH 7)
Media & the Masses (TEACH TECH 8)
The Instructional Resource Center (TEACH TECH 9)
The School of Tomorrow (TEACH TECH 10)
The Teacher of Tomorrow (TEACH TECH 11)

style for the sake of consistency necessary in most conventional film forms.

2. An Asteroid may be removed from a Planetary film (because of obsolescence, to speed up the presentation, or for reasons including inappropriateness for the viewers involved, or simply that "it doesn't work") without destroying the value or continuity of the rest of the material.

3. Modular structure permits branching, not only "lineally" within the same film (by dropping out segments and moving to the abstract more quickly); but also "horizontally" (by selecting and assembling in a new arrangement Asteroids from one or more Planetary films).

4. Logistically, the coding and segmentation of the Asteroids makes identification easier; simplifies the matter of ordering new segments, reducing the possibility that they may be unidentifiable when removed from the main title; makes possible the economic stockpiling of "most used" segments by the laboratory for immediate supply purposes.

5. The wide range of screen times provided by all parts of the Galaxy makes it easier to program the material as television segments, or as cartridge-loaded 8mm presentations.

6. The scope of all materials taken together is "wide-scan," and largely teacher-centered. As mentioned earlier, this is probably the first time that film materials have been intentionally designed to be taken apart and re-edited by the teacher, in order to meet strategic instructional objectives which can never be fully anticipated by the producer of such materials.

Editing the Asteroids

If there is one single, most universally understood rule about the use of non-theatrical motion pictures and especially those used in instruction, it is: "Don't cut the film."

Rental libraries, public school film libraries at the state and local levels, and college and university audiovisual centers necessarily impose this regulation, along with specifications for repairing, rewinding or non-rewinding of films to maintain and protect the material intact, in its original form.

The intent in the Galaxy films, however, is that they may be altered, edited, and reassembled, as a necessary condition for maximum utilization in meeting individual instructional needs. It should be remembered that the users in this case are not "average classroom teachers" at large, but rather media-oriented instructors in most cases either with experience in film handling or with access to motion picture personnel and facilities as in the case of those associated with audiovisual resource or production centers.

At the same time, it is recognized that there are two major barriers to usage in this mode.

1. The psychological barrier involves the question of whether even media-oriented instructors will take the time to cut and splice material. Will they be sufficiently motivated or stimulated by the information and ideas contained in the Galaxy to use the films to the maximum in the non-linear manner suggested. To what extent will they be able to overcome the tradition and habit of using films intact--from the can--instead of "rolling their own"? This is a subject for study in itself.

2. The mechanical barrier is, of course, related to the psychological. Unless the act of cutting and splicing is a very simple, easy one, it is unrealistic to expect the material to be used in the manner suggested. One solution to ease the use of Asteroids (which are from approximately one to eleven minutes in length) would be to put them into 8mm cartridges for use in a Fairchild-type projector. While such

use is anticipated, this alone does not completely solve the problem of how to maximize the use of the films in whole, as well as in parts in 16mm with large groups where 8mm rear-screen projectors may not have the capacity in terms of length or image size to serve the purpose. Also, cartridges are, like reels of conventional films, "canned" and not easily accessible for re-editing.

Another possible way to rearrange and simplify the use of the material might be to re-record from film to a classroom-type video tape recorder. This system, for the moment, is neither accessible nor economic in most settings, although it may become more useful in the future.

Attention was turned to how to overcome the technical problems involved in making it possible for the user of the films to remove and replace Asteroid segments from the Planetary films, locate, rearrange, and then replace them in their original position in the major film with minimum equipment and effort.

A number of leading motion picture laboratories were first invited to respond on whether they would be able to produce a numerical and alphabetic edge-coding system for duplicate negatives from which edge-numbered release prints could be struck. The George Colburn Laboratories of Chicago, was able to work out a satisfactory method of producing an edge-coded reversal fine grain print from which duplicate negatives and subsequent release prints could be printed. Codes for each of the Asteroid films were printed at one-foot intervals along the margin between the film edge and the outside margin of the sprocket hole with the abbreviated title of each Planetary film and the number of each Asteroid clearly visible to the normal eye without magnification.

This technicality is important to the potential use of the film series as projected, since all segments may be identified by edge-number without the necessity of a bench viewer or footage counter. The edge-code would make it easy to replace an Asteroid segment back into the correct Planetary film from which it was taken.

This provides a kind of indexing system which serves the user and also provides a practical and exact method for ordering additional prints of sections or replacements from the laboratory. The title information could be amplified with other information, if necessary, in the heretofore unused .036" space between the outside edge of the film and the outside edge of the sprocket hole on 16mm print stock.

A second and related problem, in expediting the flexible use of the material is how to simplify splicing and unsplicing of the segments identified by edge-code, so they may be easily assembled and reassembled.

The simplest and most economic method of editing the material at present seems to be in the use of an inexpensive splicing block, a single-edged razor blade, and 16mm perforated splicing tape.(4) The steps in editing an Asteroid out of a Planetary film are these:

1. The Asteroid is identified by the code on the edge of the film, corresponding to the title of the Planetary film of which it is a part and the position it occupies in that film. For example, the Asteroid describing the major steps in the process of communication is edge numbered "Proces-Com-1". This means it is the first Asteroid in the Planetary film, The Process of Communication.

2. The code number may be located by visual inspection, reeling the film between bench rewind spindles where convenient, or on the projector where necessary.

3. The first code identification begins in the middle of the fade-in at the head of the Asteroid and continues to the middle of the fade-out at intervals of one foot. The fades (black areas) between each Asteroid and the sound track have been located in such a way that neither picture or sound will be violated by a cut in the middle of the fade, or by subsequent cuts in an area of approximately

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(4) The system used by our editing staff was the Birns & Sawyer tape-splicing block which costs about $10.00.

one foot or 20 frames on either side of the middle of the fade.

4. The middle of the fade-in is placed, emulsion or base (shiny) side up, on the splicing block, and the razor is used to cut the film parallel to the frame-line. A 3 or 4 foot section of blank leader (preferably single-perforation) is placed on the splicing block with the perforations matched to those of the Asteroid and the razor is used to cut the leader on the parallel.

5. A four-frame section of splicing tape is cut off the roll, and with both the leader and head of the Asteroid positioned on the pins of the splicing block, the perforations of the tape are slipped over the pins in the splicing block over the cut ends of the film so that the perforations in the tape match those on either side of the cut. The tape is then pressed onto the film to secure good adherence.

6. The leader is fed onto a reel, and the attached Asteroid is reeled up (using the projector or a rewind).

7. The end or fade-out of the Asteroid is located, cut, and spliced either to tail leader or to the middle of the fade-in of a subsequent Asteroid in the same manner.

8. The remainder of the Planetary film is spliced together in the same manner so it is intact and useable.

9. The edited Asteroid(s) is rewound for projection.

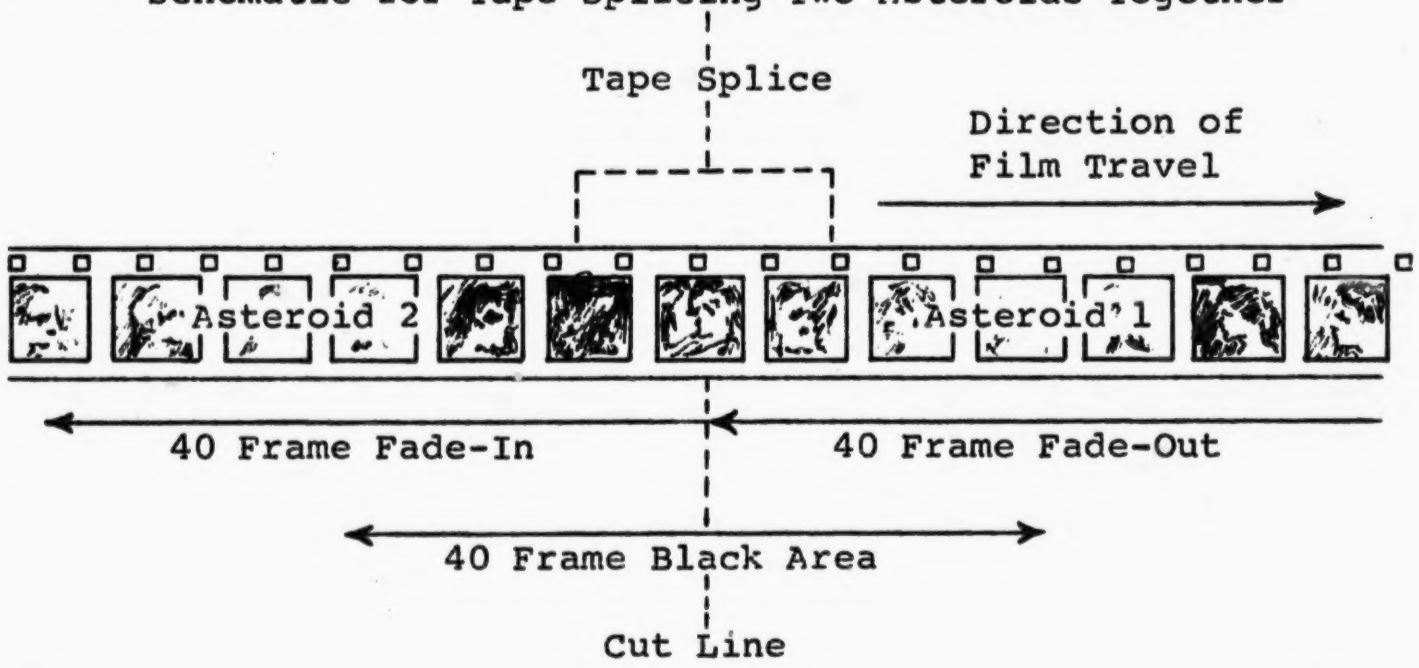
When the Asteroid(s) is replaced in the original position in the Planetary film, the same procedure is followed in reverse. The splicing tape is removed, and the cut ends of the Asteroid and the Planetary film will match and may be tape-spliced without loss of a frame. This system makes it possible to cut such an Asteroid in and out of a Planetary film a considerable number of times without loss of footage.

In some cases it may be desirable to use conventional film splicing methods, which means the loss of a frame every time the film is cut. Even here, there is considerable leeway, since approximately one foot or 40 frames may be dropped in splicing without losing essential information. The beginning and end of each Asteroid has been designed with picture and audio information cushions so that loss or damage at the head and tail is minimized.

With a little practice in applying the tape, it is felt that the technical barrier to utilization in the mode suggested here, will be overcome. It is also reasonable to expect that some instructors will eventually order separate Asteroids which they use most as "on the shelf" items, leaving the Planetary films intact for general screenings. (See Fig. 11.)

FIGURE II

Schematic for Tape Splicing Two Asteroids Together


Tape Splice
Direction of Film Travel
Asteroid 2
Asteroid 1
40 Frame Fade-In
40 Frame Fade-Out
40 Frame Black Area
Cut Line

Patterns of Use

Including the four Planetary films, thirty-one Asteroids, and five Satellite films, a total repertoire of 40 filmic experiences is presented in this Galaxy. This is a potential of 1600 possible combinations in which this material may be edited, or arranged.

The ultimate and most fruitful uses will, of course, depend on the perceptivity and creativity of individual instructors and their willingness to study the film material for its potential usefulness in their own teaching. It will also depend, in part, upon their understanding of the medium itself.

The motion picture is a "high information" medium. A single frame of film (not to mention the scene or the sequence) in addition to the information deliberately "cued" to convey the intended message, may include a considerable amount of "redundant" or unintended information. While an excess of such information is undesirable in a linear, informational message, there is probably an irreducible minimum of redundant and/or extraneous information in every human communique which is perceived by at least some part of every audience. In some cases, such unintentional information may be helpful, serendipitous, and, if deliberately considered as part of the message design, may infuse certain types of information with desirable, suggestive, provocative, and rich background values in addition to the immediate and intentional foreground information.

While, in the present films, the primary consideration has been to develop a series of informational film documents, a great variety of "to whom it may concern" messages exist throughout the material. It is there kinds of "discoverable" values which may, in the long run, make the material most exciting and useful to both teachers and students, as they add their own perceptions to the images that appear on the screen.

As a starter, however, there are several usage patterns into which the material could fall (vertically and horizontally as well). Samples of these obvious usage patterns are suggested in the following pages.

The usage patterns here suggested are not intended as an exhaustive index of the content of the Galaxy of films, but rather as springboards for thinking about new combinations of the material which will, in turn, stimulate creative applications in instructional situations.

The listing of Asteroids containing statements about communication and media (Usage Pattern F), for example, could be used to pull out "quotations" as we commonly do from printed materials. Or, one could assemble a series of compatible or contradictory views composed of segments from Hoban, Gerbner, Dale, or McLuhan. Asteroid INFO EXPL 7 in which Dale and Schramm give the historical background of the communications revolution, might be followed by the Asteroid TEACH TECH 2 in which Finn outlines the development of instructional technology. Together, in about 11 minutes of film time, the attention of the audience could be concentrated on historic perspectives.

Other similar horizontal structures of Asteroid segments could produce composite pictures of such diverse aspects as: the image of the teacher; the role of feedback in the communications system; the use of rear-screen projections; the validity of media research projects portrayed. Questions could be raised such as: "What is the price of technology in education?" "Are the technological systems shown too complex for most existing educational systems?" "Are they too expensive in terms of existing school budgets?" "How may communication be considered as method, value, and social fact?"

Field testing of this theory of film design will need to be undertaken together with analysis of the codification system to determine its possible further application in implementing creative usage and solving a part of the retrieval problem of film materials. Not all filmed information necessarily lends itself to this kind of design. But if we are to reach the ever widening and increasingly diversified audiences which are developing all over the world today, there is a need for serious study of adaptable, flexible design of all kinds of materials to meet changing needs of audience, subject matter, and conditions of use.

In this connection it is interesting to speculate on what Norbert Weiner refers to as the "To-whom-it-may-concern" message which he describes as:

> "...an undirected message spreading out until it finds a receiver, which is then stimulated by it ...If I were to construct a learning machine of a general type, I would be very much disposed to employ this method of the conjunction of general spreading "To-whom-it-may-concern" messages with localized channeled messages...a conjunction of spreading and channeled messages."

Weiner is not sure why such messages exist, but says, "...I am rather inclined to attribute them to the non-digital analogy side of the mechanism responsible for reflexes and thought."(5)

Perhaps, in turning our attention to programming, and to information theory, we have neglected the study of man's ability to structure for himself. The film design described challenges him to prove he can.

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(5) Weiner, Norbert. The Human Use of Human Beings, Doubleday Anchor Books, N.Y., 1954, pp. 70-71.

USAGE PATTERN

A. Media in Instruction

SATELLITE CODE:
Communications Conference--S-1
Communications Revolution--S-2
Multiple Option Television--S-3
Teaching Machines--S-4
Music Research--S-5

DESCRIPTION	PLANETARY	ASTEROID	SATELLITE
Amplified Telephone	INFO EXPL	4	
	TEACH TECH	4	
Audio Tape	INFO EXPL	4,5	
	PERCEPTION	3	
	TEACH TECH	4,6,7,8	
Chalkboard	PROCES COM	4	
	TEACH TECH	4,7	
Computers	INFO EXPL	2,4	
	PROCES COM	7	
	TEACH TECH	1,6,7	
Demonstrations	PERCEPTION	6	
	PROCES COM	3	

USAGE PATTERN

B. Media and Subject Content

SUBJECT MATTER FIELD	PLANETARY	ASTEROID	SATELLITE
Educational Administration	PROCES COM	5	
Industrial Training	PROCES COM PERCEPTION	3 3	
Languages	TEACH TECH	5,6,8	
Literature	TEACH TECH	3,4,5	S-2
Mathematics	TEACH TECH	5,7	
Medicine	INFO EXPL	5	
Military Training	PROCES COM	4	S-1; S-3
Music	TEACH TECH	8,10	S-5
Sciences	PROCES COM TEACH TECH	7,8 6,7	
Social Studies	PERCEPTION	4,5,7	
Teacher Education	PROCES COM	5,6	

C. Media and Instructional Groupings (Continued)

INSTRUCTIONAL GROUPING	PLANETARY	ASTEROID	SATELLITE
Industry Training	INFO EXPL	4	
	PROCES COM	3	
	PERCEPTION	3	
Large Group Instruction	INFO EXPL	3,5	
	TEACH TECH	6,8,9,10	
	PROCES COM	4,7	
Small Group Instruction	INFO EXPL	4	S-3
	PROCES COM	3,4,5,6,8	
	PERCEPTION	3,4,5	
	TEACH TECH	3,4,5,6,10	
Independent Study	INFO EXPL	1,2,3	S-4; S-5
	PROCES COM	6,7	
	TEACH TECH	1,5,6,7,8,10	
Ungraded, Continuous Progress Programs	PROCES COM	7	
	TEACH TECH	5,6,7,10	

USAGE PATTERN
D. Specialized References

CENTRAL REFERENCE OR THEME	PLANETARY	ASTEROID	SATELLITE
Audiovisual Center, The	PROCES COM	4	
	TEACH TECH	3,5,6,7,9,10	
	INFO EXPL	4	
Audiovisual Specialist, The	PROCES COM	4	
	TEACH TECH	3,6,7	
Face-to-face Communication	INFO EXPL	1,3,4,5,6	S-1; S-2
	PROCES COM	5,8	
	TEACH TECH	5,6,7,11	
	PERCEPTION	3,4,5	
Freedom of Communication, Feedback, and Responsibility	INFO EXPL	1,3,6	S-2
	PROCES COM	2,3,4,5,8	
	PERCEPTION	2,4,6	
	TEACH TECH	4,7,11	
History of Communication	INFO EXPL	1,2,3,6	S-2
	PERCEPTION	1	
	TEACH TECH	2	
Psychology of Perception	INFO EXPL	6	S-1
	PROCES COM	2,5	
	PERCEPTION	1,2,3,4,5,6	
	TEACH TECH	7	

USAGE PATTERN

E. Individuals Quoted on Film

NAME OF RESEARCHER/WRITER/TEACHER	PLANETARY	ASTEROID	SATELLITE
Rex Arnett, Language teacher, Brigham Young Experimental School	TEACH TECH	5	
Donald L. Bitzer, PLATO Research, University of Illinois	PROCES COM	7	
Vance Bourjoilly, Author	TEACH TECH	4	
Hadley Cantril, Chrm. Bd., Inst. Intrn. Social Res., Princeton Univ.	PERCEPTION	2	
Chester Caton, Capt., Air Force Academy	TEACH TECH	3	S-3
Louis Chatterly, Math teacher, Brigham Young Laboratory School	TEACH TECH	5	
Edgar Dale, Prof. Education, Ohio State University	INFO EXPL	1,2,6	S-1; S-2
John Dos Passos, Author	TEACH TECH	4	
Shirley Duncan, Headstart teacher, Columbus, Ohio	PERCEPTION	5	

CHAPTER III

8MM -- ITS PROMISES, PROBLEMS, AND PITFALLS - AS VIEWED BY FILM PRODUCERS AND DISTRIBUTORS

Albert R. Bailey

An informal and impromptu survey of the producers and distributors of 8mm films today brought into focus quite a unanimity of opinion, as well as a few individual statements pertinent to the subject of this paper.

Only twelve people replied to my request for their thoughts -- a third of those polled. However, they include two from the largest distributors of 16mm educational films and many of those who are most active in the distribution of 8mm short films -- I assume the others failed to reply because of the very short deadline I gave them rather than to a lack of interest. The almost total agreement of everyone makes up for the small number reporting.

To summarize the responses.

As to promises, there is 100% agreement that the future is terrific. The difference of opinion lies only as to how terrific, for it ranges from several prints to everyone now sold in 16mm, to the glowing prospect of a complete film library in every classroom. Undoubtedly, the realization will be somewhere in between. As to problems, it is apparent that there is only one major problem confronting those who would produce and distribute 8mm films today, and that is the lack of standards, not only concerning sound and cartridge, but concerning the basic need for a standard format -- regular 8mm or Super 8mm.

As to the pitfalls, these seem almost limited to quality, and the possible lack thereof; to the possibility that enough training in the need and use of the 8mm and particularly the 8mm short film, will not be forthcoming; and that there may be too much rush and too little thought.

Now for more details.

Promises are always inviting to discuss, and so it was with those who responded to my inquiry.

Erv. Nelsen, of Coronet Films, writes, "The introduction of 8mm is still a rather nebulous and unsettled and seething issue. Perhaps the ultimate general acceptance of 8mm as an effective standard of message transport will depend largely on the effectiveness of the 8mm short film concept in teaching-learning situations. We think there is a market. We have no real way of knowing _yet_. Many of the producers will pioneer in the field to determine if that market is really there. The extent to which short films are purchased and effectively used will determine its further refinement and development as a significant teacher-learning aid." This rather sets the stage by giving us a beginning from which others can make their evaluations and forecasts; by giving us a statement as to what is going to take place over the next few years; and by giving us the important evaluation that the market will be there if effective material is developed for that market.

Berry T. Stevens, Science Research Associates, Inc., presents another governing statement, "We see an increase in training today and a corresponding increase in interest about _assorted_ training materials."

Jam Handy Organization's, A.J. Bradford, offers that the "8mm film and projector is making and will make a major contribution in the following areas:

Selling - to individuals or to small groups
Training - for small groups, or again individuals
Teaching - as a teacher's aid in the classroom
and in some courses in the carrel.

"The reason for this is merely an extension of the fact that few things can do the job of motivating and of communicating information as the motion picture. The 8mm projector with its specially designed films makes the medium much more flexible, putting them within easy reach of individuals or very small groups."

Scope Productions, Inc. offers more concrete figures: "If we use our sales figures (1965-66) as a basis, prospects have gained 100% in one year. We see the loop format as a major innovation for the teaching of processes and skills in every area of the general public school curriculum."

In the September 1966 Journal of the SMPTE, Albert Rosenberg of Mc-Graw-Hill wrote, "We expect that (now) the educational field will buy five 8mm prints for every 16mm print purchased in the past. We hope to develop the 8mm optical sound market so that in a few years when a good low-cost cartridge or magazine projector becomes available, the market will be there. By that time, the field should be purchasing 15 or 20 times as many prints as it is doing now."

Ed Treiberg of Charles Cahill and Associates, Inc. believe that "the potential market is at least equal to the number of schools in the country. I feel this way, because I think of 8mm loops as having the same potential as filmstrips. Possibly even more when used to 100% efficiency through classroom use, group use and individual use."

And I particularly like the line written by Kay Smallzried of Chandler Publishing Company: "The prospects of 8mm films are limited only by the limits of human ingenuity."

These quotations should offer a lot of opportunities for discussions about the prospects of 8mm because there are statements that will be disputed by some, and other statements that will offer new ideas regarding the adaptability of this medium.

They also lead us logically into a discussion of the problems, because we are immediately confronted with the problem of definition, as Fred C. Amos of Ward's Natural Science Establishment, Inc. brings up the point that "The question of WHAT IS A SINGLE CONCEPT is another difficulty. Many films try to do too much." To this we can add Ed Treiberg's, "I think of 8mm loops....", and Erv Nelsen's, "In our opinion, at present, there isn't even any standardization on what we call the short films. Single concept certainly is limiting. Coronet anticipates producing in areas other than single concept -- what has been called loop....Eastman.... has interjected another classification or name -- miniature."

Perhaps problems of definition are solved by use over a period of time, although in these few lines there is ammunition for discussion. My own opinion is that there are more important things to discuss at the present time.

To put first things first, the basic problem that we must solve at the present time is the need for a standard in the film itself. Are we to have regular 8mm or Super 8mm? Since many producers already have a large investment in the regular 8mm size, they are reluctant to see this standard become obsolete and also to make another considerable investment to change over to the Super 8mm size. They also recognize the fact that many educators are in this same position. Further, there is much feeling expressed, both in this country and abroad, that in small screen projectors for individual or small group viewing the regular 8mm gives results comparable to the Super 8mm. At the same time, these people recognize the fact that for larger projection sizes the Super 8mm has definite advantages.

However, when the total investment in regular 8mm made to date is compared with what the total might be five years from now, or even two years from now, it is really quite small indeed. And might we not ask these producers if the sales results they've achieved to date have not already paid for the investment in the actual printing masters or internegatives (as opposed to investment in film production, which will not need to be scrapped if a new size format is adopted)? And isn't the lead they've established in the field worth some of this investment?

Because of these factors, some people feel that perhaps we should have a dual standard, such as regular 8mm for the silent single concept or short film, and Super 8mm for the sound film and for longer films. But the market place is changing so rapidly that we are already past such a possibility. I point to two manufacturers who have, within the last 90 days, almost guaranteed that the standard will be Super 8mm. The first is the Eastman Kodak Company which is readying a new line of Super 8mm projectors designed to use short films in a reel-to-reel system with a special cassette and a fast rewind; and the Technicolor Corporation, which is readying a new line of Super 8mm cartridge projectors, including a sound cartridge, and already proposing a plan for trading in regular 8mm for Super 8mm at a very low price.

One of the leading 8mm distributors, International Communications Foundation, which distributes only regular 8mm at the moment (although many of their subjects are available in

Super 8mm through the Ealing Corporation) is about to advertise a very advantageous trade-in plan so that those who buy regular 8mm now will be assured that they may trade for Super 8mm in the future. This reflects the one agreement that no matter what we do now, let's try not to keep customers from going ahead with 8mm purchase plans.

So at this point I'd like to make the statement that for all practical purposes we now have a film size standard, Super 8mm. The problem, then, is to accept this standard and to plan how to make the transition to this standard as rapidly, inexpensively, and smoothly as possible.

A second, and closely related, problem that must be solved before we're ready for the really big show in 8mm, is the achievement of a standard sound system, for as surely as 16mm sound replaced 16mm silent, so will 8mm sound replace 8mm silent. At the present time, there seems to be a wide gulf between those who feel that the standard will be magnetic sound, and those who feel that it will be necessary to have optical sound for the most extensive and least expensive distribution of films.

Here, at this moment, we can see no narrowing of the gap between the proponents of these two standards. Eastman Kodak, in their new projectors, are planning magnetic sound, because among other reasons, they believe this will give the largest market inasmuch as the home market can be included. Technicolor has just developed an optical sound, that is made to the same standards as those of the DuKane projector, so fortunately a film made for one machine can be used on the other (except that one machine uses a magazine and the other a reel). This is a standard for which many producers have been waiting.

G.G. Graham of the National Film Board writes that, generally speaking, "the disadvantages of magnetic track are: 1. At the present time magnetic prints cost more than optical prints. 2. There is danger of accidental erasure. 3. There is the possibility of deliberate changes in sound tracks which might prove embarrassing. I might also add that, most important of all, there is no way of knowing whether or not the track remains perfect after preview or use without actually listening to it."

The other problems seem to be these, not necessarily in order of importance.

Scope Productions asks for quality control in the following areas: Reduction prints, film stock, emulsions; lubrication and capsuling of prints; optical definition (professional standards) lab equipment; projection equipment.

Chandler Publishing Co. writes, "Few distributors, as titles available increase, will be able to send out complete sets of films for indeterminate lengths of time (even though the preview period is stated as being 30 days, the films are seldom out and back within that length of time). Consequently, the preview package with a suggestion that the customer order from the package, and return unwanted films for credit would seem feasible. We are going to try it."

And from Ed Treiberg, "One of the major problems (with loop films) -- educating the teachers to use the films properly. This includes a thorough understanding of the subject matter, method of implementation into a unit of study, and the ability to encourage students to study and view the subject on their own. One solution to this problem is a greater, more all-inclusive in-service program for teachers in their respective districts. Such a program would have to be initiated by the district A-V director and, very likely, involve the assistance of commercial people. In fact, I think it would behoove the commercial people to offer as much assistance as possible for workshops, in-service, special demonstrations, etc." From the religious point of view comes a statement from A.L. La Com of Cathedral Films, Inc., which certainly has its parallel in the school market, "I expect that one of the greatest deterrents in the religious market is the cost. A church in setting their budget would very likely consider purchasing filmstrips and renting 16mm films rather than buying an 8mm instant movie projector and a library of cartridge films because they would most likely already have a sound filmstrip projector and 16mm motion picture projector in their possession." And further, "We find the churches slow to accept new teaching methods and the move towards the Technicolor Single Concept cartridge materials is no exception. We are finding the greatest interest in this material from the foreign market where scripts are easily translated into the language of that country." Here's a ray of hope for additional markets for the silent single concept films produced for the school market.

John Lord of Film Associates brings up an important point, "Audiences used to seeing camera original Kodachrome II projected at home are shocked at the quality of commercial prints made from an internegative, made in turn from a 16mm ECO original. Of course, print quality can never equal that of a Kodachrome original, but there is plenty of room for improvement. Kodak and the laboratories are doing everything they can to de-bug their systems and, hopefully, we will see a major improvement in a few years. And, let's face it, there is also room for a major improvement in the quality of the content of the loops."

Erv Nelsen adds: "Another general 8mm problem is the misinformation which has been circulated regarding costs of 8mm as compared to 16mm. There are those who propound that 8mm silent (and some stretch it to sound) will cost only ¼th that of 16mm. This seems to be a carry-over from the home movie field and related to the cost of the film material only. Often there has been complete disregard for the cost of producing the material that goes on this film whether it be 8mm or 16mm. Obviously, the production cost is the same. Any further savings would have to be presumed based on lower costs related to the larger number of prints sold. This projection to reduce the price of a single print could be as applicable to the 16mm field as to the 8mm.

"Another problem involving the 8mm short film concept is the possibility of producers jumping into 8mm without adequate research or planning. Materials producers will need to continue as intensive research and as careful planning as they have for 16 millimeter."

I might also point out the need for a number of makes of projectors with interchangeable cartridges or film transmission systems, so that as with 16mm sound, the same film can go anywhere in the world and be shown on almost any projector. In this way, a learning system or any one brand of film material will not have to rely on any one brand of hardware.

The need for more laboratory facilities, especially for Super 8 and Super 8 sound will probably take care of itself; although at present, the demand seems to be outstripping the supply.

The cost of prints is still far too high to allow market saturation to be achieved on the scale that many people project. Perhaps a good closing statement for this section on problems might be the one Kay Smallzried used as an opener, "When it comes to discussing the problems, I am linguistically disabled. Profanity does not become a woman, and the degree of exasperation and frustration encountered scarcely permits anything else."

Possibly there might be some overlapping between problems and pitfalls, but among the thoughts I received are the following, starting with Scope Productions suggestion that "abuse of format, e.g. commercial marketing implication of do-it-yourself programming is not logical or practical; and that research and development on the part of the manufacturers should be geared more closely to educational needs, following the canons of current learning theories."

A.J. Bradford writes that "Planning for pictures and picture programs will still need to include the following:

To whom the films are to be shown
How they will be shown
Training of people who will use the films
Provision of regular service for prints and
 for projectors in the field, where they are used.

And to repeat perhaps, probably the greatest likelihood of incorrect usage will be the tendency to use 8mm with groups too large for the picture or on a subject not suited to 8mm projection."

John Lord believes there may be a pitfall in the price of laboratory work, pointing out that "Kodak's new high speed 4-row printer that records on pre-striped 35mm film during the printing pass makes reasonably priced magnetic sound feasible for the first time. The problem is that this printer is intended for runs of thousands of prints. Somehow, for most titles, the future doesn't look that rosy. For a print order of only a few hundred prints, one may have to use a much more expensive process, with a separate transfer step. This could produce a horrifying difference in price between large-volume titles and more specialized ones, a difference that would be difficult to justify to the schools. Also, the fact that these cartridges will be sold in supermarkets for home use will determine price range, in the same way that the prices for records in the home determine, to some extent, the prices of educational records. I do not believe it is wise to assume that in terms of standardization, marketing, and pricing, schools are one thing and homes another. There is going to be a lot of rubbing off, which will create problems for the educational distributor."

Unless there is an early adoption of standards on the part of industry, or the acceptance of some kind of generous trade-in policy for one format 8mm toward another, Ed Treiberg says he's "afraid more and more people will continue to bide their time waiting on Super 8 and miss a lot of good educational material in the process."

A possible pitfall to Albert Rosenberg is that if school people do not use and experiment with 8mm now it will be unfortunate, because "during this period the schools will discover the unique contributions of 8mm--not as a replacement for 16mm but as an additional resource."

Erv Nelsen sees that "there is a great danger of materials producers getting 'sucked in' to companion equipment sales. There are those manufacturers, and very reputable, who have the pioneering spirit to come out with equipment and of trying to package it with materials in order to crack the market. It is perhaps a necessary evil. Materials producers must be wary of identifying themselves firmly to a single system in a field which has not yet settled out. Thus, in the case of Coronet Films and our motion filmstrips, which we call the short films, we will have loops available in both regular and Super 8 and could even have these short films which are not single concept available in the Eastman 'reel-to-reel' system."

This brings to a close a digested statement of possible promises, problems, and pitfalls of 8mm as viewed by the producers and distributors of educational film material. There are many shades of opinion included here; and there are many more opinions and shades of opinions that have not been included because of lack of time, lack of space, and lack of response.

Reviewing many of the statements sent to me, including the extensive paper "A Status Report on the Professional Use of 8mm Film" by Gerald G. Graham, of the National Film Board of Canada, and recognizing that a major part of our 8mm conversations today resolve around the lack of standards or the possible acceptance of multiple standards, I want to quote from Mr. Graham.

"In terms of international acceptance, there appears to be no doubt that the Kodak Super 8mm format will ultimately be accepted on an international basis. Support for this view is given by all major European, Japanese and American camera manufacturers who are now producing new Super 8mm format and many have announced, or are in the process of announcing, suitable projection equipment to go with it. At the recent SMPTE Conference in Montreal, the Russian delegates stated that their country was quite prepared to adopt Super 8mm as an international standard."

The next few years -- nay, the next few months -- are very apt to produce the standards that we are looking for and to solve many of the problems that we presently face. During this time, let us bear in mind Erv Nelsen's belief that "It is wrong to 'zero in' specifically on 8mm single concept films. I think, as an industry, we must take a look at the broader picture; the entire 8mm concept as a new technical transport of the educational message -- now relegated to 16mm."

And during this time, let us avoid the apparent pitfalls and devote our energies to improving the educational materials that we produce and the distribution system that carries them to teachers throughout the world.

END

Author's note: In addition to my own ideas set forth in these pages, I want to extend thanks and give credit to the following companies and individuals who supplied information which makes up a very substantial and important part of this paper:

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National Film Board of Canada, G.G. Graham, Director, Technical Operations
Science Research Associates, Inc., Berry T. Stevens, Industrial Sales Manager
Scope Productions, Inc.
Ward's Natural Science Establishment, Inc., Fred C. Amos, Director of Product Development

CHAPTER IV

CARTRIDGED FILM EQUIPMENT --- WHERE DO WE GO FROM HERE???

Elwood E. Miller

For nearly three years the author and other interested parties at Michigan State University have been following with great interest developments in the so-called single concept field. During this period of time we have been in constant communication with three general groups of individuals, all represented now at this Conference on cartridged films.

The first of the three are the potential users; that is, the students, the teachers, the curriculum designers, and the educational administrators who usually control budgets and purchasing.

The second group are the film production and distribution companies who are specifically interested in making and marketing films.

And the third group is that composed of the manufacurers of the hardware that is so vital to the effective use of this new medium. Communication with the first two groups is relatively easy, but communication with the hardware interests is much more difficult. They work within severe limitations of organizational policy that often prevent them from reflecting much real information on developments of single concept machines.

It is not my function to criticize the policy that they maintain, for such is the basic nature of the American system of free enterprise.

Despite the fact that there are many strengths to the economic system that we can observe with satisfaction, there are also problems that seem to be basic to the reasons for this Conference.

Has the single concept movement or, in more general terms, the cartridged film movement grown as rapidly as it might have? Or has it grown as fast as is reasonable for a "new creature?" There is probably no firm answer to the question, and opinions would be shaded from one extreme to the other.

The users and the filmmakers tell us that they feel the cartridged film movement might have progressed at a faster rate had some consensus been reached by those who make policy decisions within the 8mm field. Eastman Kodak can assume many of the credits for technological advances in the narrow format film field, but at the same time must shoulder part of the responsibility for some of the indecision that we are forced to live with at this point in time. Others are no less firm in their own organizational commitment to a format which they feel may provide for them some economic advantage.

Educators and filmmakers share a common concern. This concern must be explored, because reasonable solutions to the problem might well have a long-range and important influence upon the rate of development of the cartridged film field.

The concern is an obvious one, and can be summed up with the often heard question directed to us by a good many filmmakers. To our question: Why have you not entered into the cartridged film field at a faster rate with more and better films? Their inevitable answer is always a question: I would love to get into this end of the film business, but can you tell me what film system to adopt? What will be the eventual standard?

In dealing with the question of suitable standards, corollary cases of the early differences in 16mm film can be cited. A much later and perhaps better analogy is the disc recording turntable speed controversy of a decade ago. Two of the original three seem to have survived, with a very definite use area for each of the two survivors.

The problem with 8mm film, for that medium seems at this point to be the logical one for the cartridge system of managing "filmed type" information, is that there are several manners of managing the image and several possible choices for managing the sound track. Therefore, all possible combinations of each differing system make it possible to come up with a dozen or more ways to organize a film in the 8mm width.

The possibility of leap-frogging the film medium and going straight to an electronic manner of storing and retrieving the "film type" information has been considered at many times by project staff members. Discussions have been held on the possibility of this trend with engineers from manufacturers of both electronic gear as well as more traditional film handling equipment. Most think that electronic systems are quite certain to be developed in the future and that they will probably eventually be universally adopted. The big question is when will such systems arrive? The answer to this question as given by qualified, highly trained men has ranged from a "couple of years" to as much as a quarter of a century. Most tend to agree that ten to fifteen years seems a reasonable and thoughtful time estimate.

Regardless of the acceptance of this basic point of view, we must deal then with the question of managing information on 8mm film for at least the next decade, give or take a little. If you agree with Silberman in the August '66 Fortune, or with a group of writers in the January '67 Phi Delta Kappan, or with Barron's newspaper, or with any of many other sources quotable in the past six months, that the technological revolution really is "at the school house door," then you will agree that we must deal with this question seriously, and soon.

Some findings of research efforts at the Michigan State University's Instructional Media Center may have some bearing on the question at hand.

In conjunction with a USOE contract, we have been investigating Single Concept Films since early 1964. The general nature of our Single Concept Film Clip Project was one of investigating the feasibility of retrieving film loops or short films from existing filmed material which is currently on the educational market. We have arrived at a number of general conclusions about single concept films as well as some generalizations on suitable equipment. As a matter of fact, we were so concerned about the equipment situation that we requested an extension of the Project with funds to plan and manage this National Conference on Cartridged Films.

The nature of the Conference is not only to discuss single concept films (as well as all films managed in self treading plastic cartridges), but to move the discussion in the general direction of a rather hard look at the standards situation. Men of applied science, more particularly engineers, have a great advantage over some of us who like to think of ourselves as specialists in instruction. They are able to use a standard, common measuring system and their vocabulary is relatively operational in that a technical word means the same thing to one person as it does to another. I suspect that they do have some communication problems within their profession (as all professions do when they work on extremely abstract and difficult levels) but nevertheless, they are way ahead of those of us in the social sciences when it comes to exchanging information between people or institutions with any kind of precision.

But we think that there is a problem of semantics for the engineers and technicians just as there is for the educators and psychologists. We are continually amazed by the lack of basic communication within the industrial and business community. We seem to turn up differing terms and interpretations as we confer with those concerned with film hardware. Hopefully, this meeting may help to solve some of these problems.

One of our major concerns is the "equipment gap" which we feel is so obvious in the single concept field today. We don't want to infer that the equipment which is now available is inferior. It certainly was badly needed and was quite sophisticated when it was introduced.

The two machines that are primarily used for teaching and learning within the cartridged film or single concept context are, of course, the Technicolor series of film loop machines that take silent 50 foot loops and the Fairchild system that takes longer films and that has the advantage of a sound track. For the size of the potential market for which these machines were developed, they are really rather sophisticated and rather good pieces of hardware. However, we feel they leave some things to be desired in terms of long-range planning and long-range development within the cartridged film field.

First let us examine some of the problems that must be solved immediately if developments are to continue in a positive direction. First, we have differences between standard 8mm and Super 8mm film. We were not greatly committed to 8mm as a format when we entered the investigation. Our major concern was the handling of single concept ideas. Nevertheless, as pointed out earlier, it seems rather obvious at this point that 8mm film is the most logical, and no doubt at least the "short-range" answer to the question of film size for use in cartridges.

However, there are actually three different 8mm systems, and without attempting to be a prophet or to dictate what should be done, we know that educators formally charged with purchasing equipment and materials for schools, and/or university departments, are in real trouble with budgeting and purchasing groups when they attempt to build duplicate or triplicate systems of 8mm when there is really not that much "screen" difference among the three. Therefore, we have issued virtual pleas to the people from industry to get together and decide which it is to be and on what basis. The "8" versus "Super 8" versus "Maurer 8" dilemma needs to be solved. We don't care to predict at this point which of the three systems is superior or which is likely to win out. Rational cases can be built for each system, but our concern is that something must be done to eliminate or at least come to terms with the duplication of systems.

The second major problem involves the use of sound. We are convinced from our investigations into the field that cartridged films by and large must have sound tracks. Sound tracks can be used for various purposes and the film can always be used as a silent film simply by turning off a sound switch on most projectors. This is not to say that there are not useable films in the silent format-- there are: But as we look at the long-range development of suitable hardware and equipment for the management of film in this medium, we have come to the conclusion that hardware with sound track capability is an absolute necessity.

Now, if you will grant us this point, it then raises the question of the next major problem within industry as far as the management of sound is concerned on 8mm film. There are two basic ways to go at it, as most of you know. One is the optical sound track similar to that which is on 16mm educational film and 35mm commercial entertainment films, though no consensus is available as to its location on the film. (Sprocket side, or the opposite side?) The alternate system is the somewhat newer magnetic sound in which a thin strip of iron oxide is placed on the film and then magnetized, much as in an audio tape recorder. Again, which side, or both, is the track to be placed on the film? There are some very definite advantages to be argued for each of the two general systems, and again our purpose is not to argue either or both of these points of view, but rather to say to you that we are pleading with industry to set up some reasonable standards so that we in education can make some rational purchasing decisions.

The third major problem is that of the laboratory problem inherent in making large volumes of 8mm release prints for mass distribution. Optical reduction from 16mm negatives has been the most satisfactory method to date. This method is too slow for high volume printing, however. Furthermore, 8mm negatives, coupled with a high speed contact printing process has in general led to less than satisfactory prints.

A glimmer of light can be reported on this problem, however. Bell & Howell has built, for Eastman Kodak, a high speed, magnetic sound, single trip machine to produce release prints. The machine uses a pre-perforated 35mm width, 4-track negative. Precision contact printing, along with magnetic sound stripping and sound transfer are all done in one pass through the machine. The release prints are slit into the "Super 8" width, and delivered ready for packaging. This machine is to be installed for study in a demonstration laboratory in Rochester shortly after the first of the year. Potentially, here is an answer to the high volume, lost-cost 8mm release print question.

Technicolor of California is also experimenting with the laboratory problems involved in making release prints in large volume with high speed equipment. No "firm" data on the Technicolor system was available at the time this paper was prepared.

In addition to the three rather obvious 8mm machine systems either on the market or likely to be on the market in the near future, there are some other somewhat exotic systems also available. Audion has mated a Technicolor machine with a cartridge tape recorder in one instance. The Panacolor machine is a system of managing filmed material where the film stock is 70mm wide. This system has twelve tracks of visual information and twelve tracks of optical sound information. The machine itself handles the film on a backward and forward basis so that there is no rewinding necessary. There has been some experimentation with double 16mm systems in which two tracks of information are put on standard 16mm film. The obvious advantage to this is the compatibility with present laboratory procedures in making release prints. However, to our knowledge, nothing serious is coming of this at the present time. We have even heard recently of a researcher in California experimenting with a 3mm width film. We know of no one who has experimented seriously with 16mm film in a self-threading or non-threading cartridge.

Another problem that seems to be on the immediate horizon is that of the film loop vs reel-to-reel mechanical system of moving and storing the film itself. Are both systems really necessary, or is this another instance of corporate "one upsmanship" that may throw another monkey wrench into the standards problem? The issue cannot be ignored.

To paraphrase Bob Wagner from Ohio State in his summary at the 1961 Teachers College Seminar on 8mm sound film and education, "Our major concern is really not whether it is 16, 8, 3, 70mm or captured on thermoplastic, or whether it appears in a bowl of jello." We need some standards that are rational and sensible so that we can make decisions for purchasing both software and hardware.

SOME OF THE USES OF CARTRIDGED AND SINGLE CONCEPT FILMS

The decisions delineated in this paper must be made before we can begin to get some real mileage out of cartridged film loops or single concept films. Let us briefly list three or four of the ways in which we think cartridged films can be used as excellent teaching resources.

Television Programing. More and more television programing is being done (particularly on college campuses and eventually, we are sure, on public school campuses) in the basic, large membership introductory courses. We feel that the addition of libraries of films built upon a single concept principle would be of great advantage to professors who must teach these classes and who must rely on some instructional resources to use in their teaching.

Classroom Instruction. The most obvious use for short films is in classroom instruction in the same general manner that standard films have been used for many years. Science teachers have made particularly effective use of films. One must recognize that science teachers have had better access to films than most other teachers. Funds were made available earlier and in larger quantity both for the production and local purchase of good science films. A classroom, single concept cartridged projection system with adequate access to materials has already proven to be an excellent new dimension to very effective traditional use of instructional films.

Self-Study. Perhaps one of the most exciting potential uses for single concept films is in the area of self-study. We are convinced of the value of self-study and would like to see the provision of libraries with materials of this kind to which students have access. We believe that learning carrels with enclosed suitable hardware in which youngsters can study single concept films intensively and without time limitations, will increase their understanding of the processes and procedures so illustrated and explained.

Inductive Learning. Another logical and obvious use of films is in the inductive learning process as described by scholars in various professional journals and reports. Certainly if we are to study the basic nature of the learning process and discover more about it, we are first going to have to begin to use materials that have some scientific validity, and second, use materials that are modular enough for experimental control. It is very difficult for us to control an experimental situation managed physically by a live person so that it replicates itself exactly time after time. Obviously, a powerful advantage of the film medium is that the film teacher never gets tired, and the inflection of the voice and the presentation never changes. Nothing ever fails to work in the laboratory as demonstrated on the single concept film. If we are to make serious research efforts into the basic nature of learning, and we must, single concept films seem to be a tool of significant value.

Do It Yourself Single Concept Films. Aside from the general emphasis today on the large volume, library resource, single concept films, there stands yet another potentially exciting use of the single concept medium. The basic economics of the 8mm film system make it possible for virtually every department in a school system to produce films of their own for purposes unique to their own institution or department. Gone are the expensive, high cost factors in making a 16mm sound film. Some limited expertise is necessary along with a basic equipment collection, but the costs are in the hundreds of dollars for very adequate systems, as compared with the tens of thousands of dollars for a basic 16mm motion picture unit.

No claim is made that the work is of similar quality, but imagination along with helpful and automatic features built into the new 8 system make for some exciting things happening in many institutions. Involving students, of all ages, in filmmaking motivates them to get at the basic nature of the concept and the manner in which it must be organized and managed in the film medium. Lifted from the teacher is his basic nemisis, the yolk of motivation. Students cannot make films, even rather ordinary films, without a basic understanding of the data and the process. And this is exactly what we are after in our teaching.

An important and basic point that we educators find hard to "get used to" is the new time or wear-out factors that are an inherent part of today's short films. The basic nature of the single concept film is such that you ought to wear it out the first year, and if you do wear it out the first year with a large number of uses, probably you are going to wear out the equipment rather rapidly too. But this is possible only with high volume use-- predicated in turn, upon reasonable standards within the industry.

This is fine. Let's wear them out so that when they are obsolete we can replace them with better hardware, better films, and better systems.

For many, many years we in the audiovisual business have lived with the notion of making a film last ten years. Certainly if anyone in the educational and industrial world knows that information that is ten years old is pretty badly out of date and relatively unusable, it's those of you in the audience selected for this conference. So fine, let's make these films so that they can be replaced every year, and let's handle them in such a volume that they can be sold at a price that will not cause our business agents and our purchasing people to blanch when we want a new set of materials each year for our classes. The very nature of the cartridged film loop, the very nature of the 8mm system leads itself to this kind of overall, long-range thinking. Within that context, and at this point in time, our plea is for better systems of handling 8mm film visually and aurally with some degree of standardization present.

Summary. We are persistently asked questions by industrial concerns relating to the kind of hardware that we think is necessary.

We have talked about most of these concerns and most of the questions in this paper. Two or three more points might be added. We think hardware of this kind should be sold under $200.00 per unit. Equipment manufacturers sometimes blanch when we use this figure, and yet the thing we are talking about here is an item of such high volume that it is not comparable with present 16mm projection systems. We would be quite happy with present 16mm equipment if the film could be managed in a cartridge and if it were in this price range. But it seems impractical to think that this will happen in the 16mm format, and it does seem practical in the 8mm format.

We think cartridged films themselves, the film loops or whatever form they take, should eventually be sold to libraries and educational institutions in roughly the same price range as that of good resource books. It is difficult to convince your dean that you need a $200.00 film, but it is "duck soup" to convince him that you need twenty $10.00 books. Consequently, there is a political and a sociological factor here that makes it very "sexy" to talk about lots of short films that can be purchased much as you would purchase resource materials for your science library.

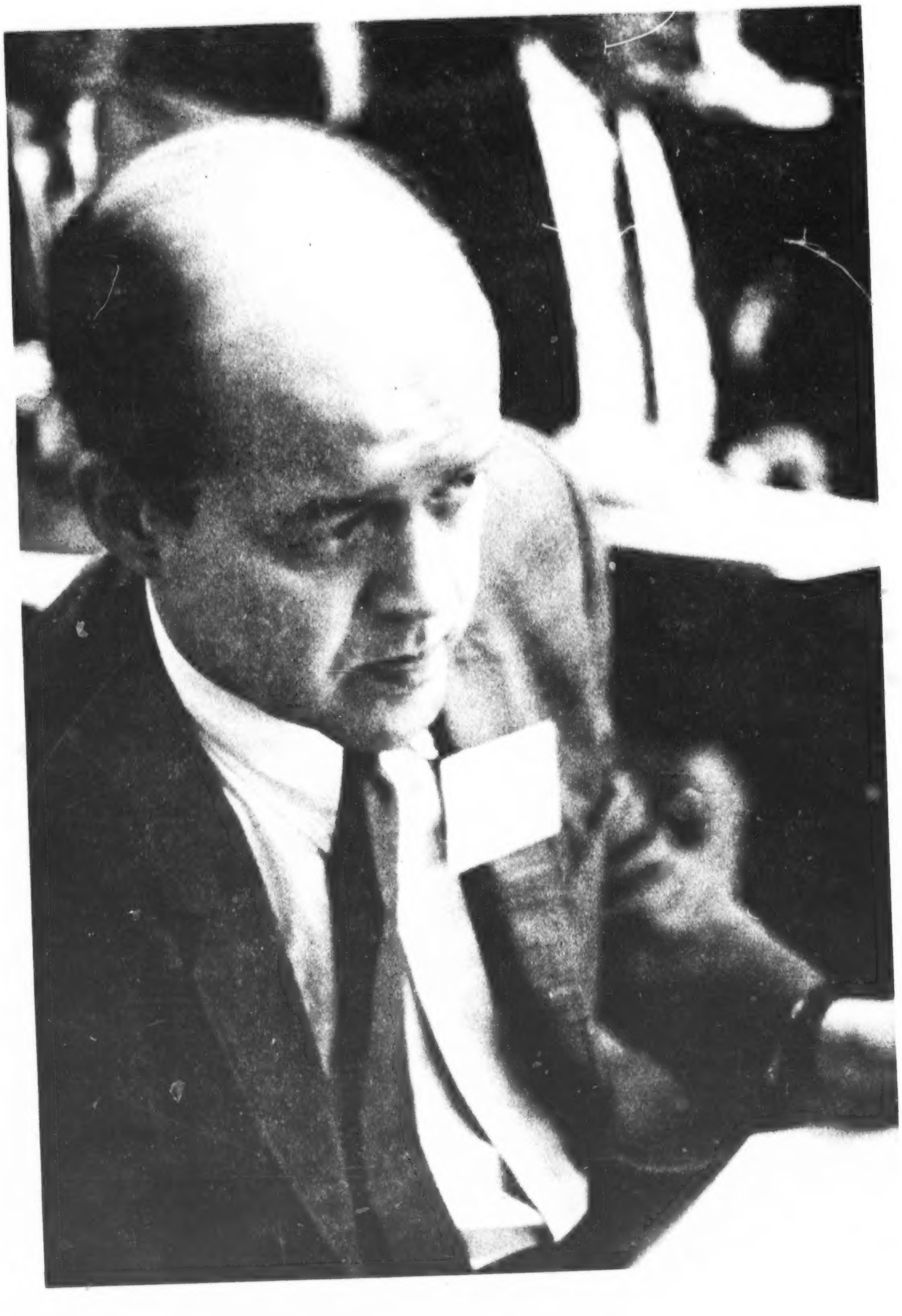
Broken down on a per-minute basis, sound filmstrips (collections of still-pictures with a record that go with them) can be purchased on the market for approximately fifty cents per minute. The silent 8mm film loops that many of you use now are selling at approximately $5.00 per minute of material, and the 16mm sound film sells today at about $10.00 per minute of material. These are not production prices but are market prices to the consumer for full-color material. We would like to see a $10.00 cartridged sound film of 3 to 4 minutes length with a sound track available to all kinds of educational institutions throughout the country.

I'd like to advance an open question which should be aimed primarily at the industrial concerns represented at the Conference. We haven't heard from some of the big organizations in the equipment field. We admire greatly the Fairchild

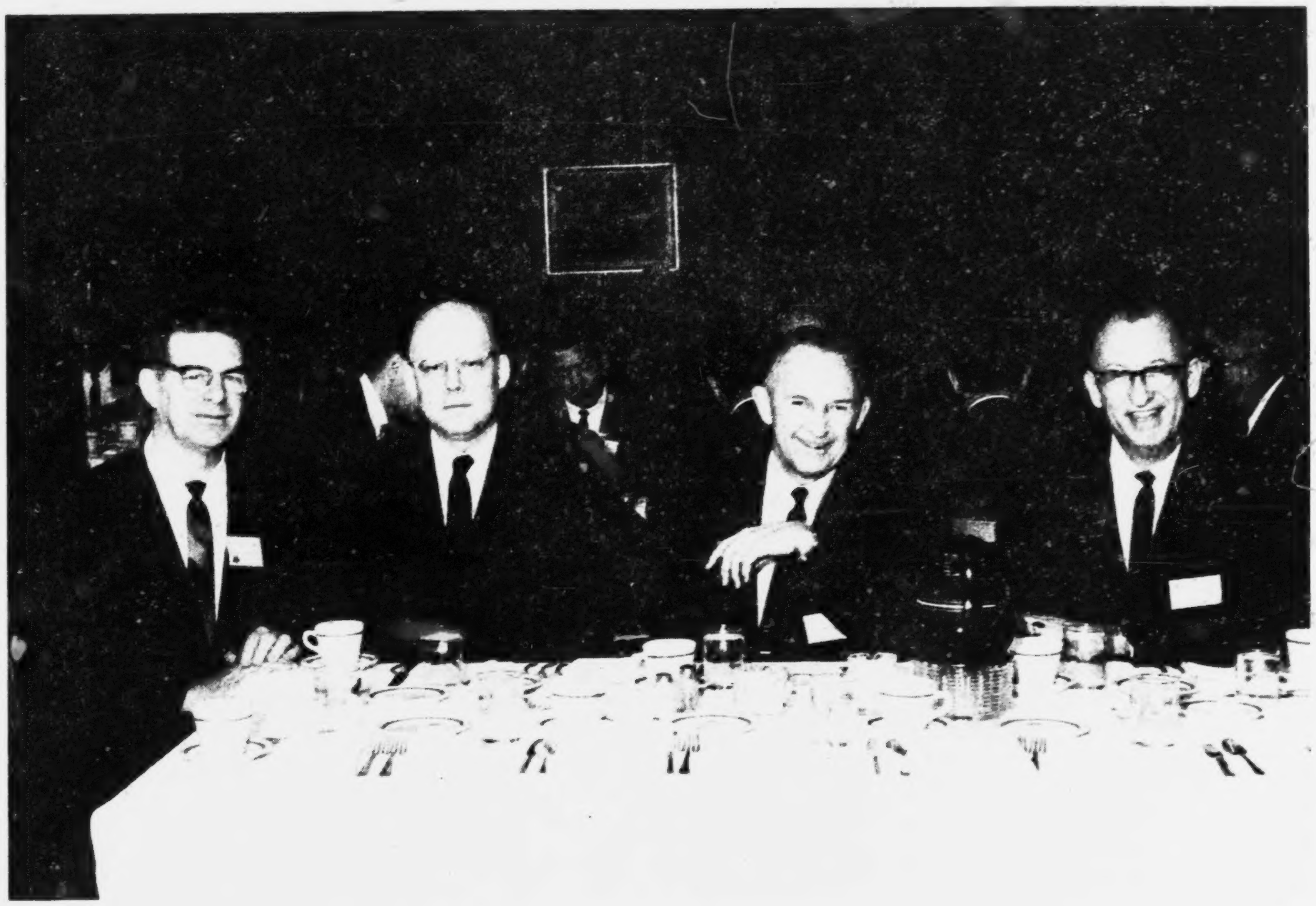
Company for taking the plunge into the 8mm market a number of years ago, and we admire Technicolor for getting into this field a lesser number of years ago with a silent machine that has sold very well for them. We haven't heard from the Bell & Howell's, the Eastman Kodak's, the RCA's, the Graflexes, and the Victorkalart's, the 3M's, the Ampex's or the Sony's. We wonder where these organizations are so far as the development of hardware is concerned to manage single concept type materials. Surely they are now planning and thinking in this direction.

In closing, we would like to emphasize the interdependency between the "software," in this case the films, and the "hardware." Assuming that some problems of standardization can be overcome, the two must grow together hand in hand. We can't buy films without hardware being available and you can't manufacture hardware without good films being available for it. So hardware manufacturers and film producers must work together. Those of us concerned with learning and teaching must not be very far behind in the development of the field. Most technicological developments in the audiovisual field have happened in spite of educators rather than because of them, and the time has arrived when we would like to work with the business community to develop newer and better systems of information handling for use in instructional programs.

Project secretaries Beverly Johnson and Mary Lou Shull register two participants at the first session.



Professor Louis Forsdale, Horace Mann-Lincoln Institute on Communications of Teacher's College, who chaired the National Meeting on sound 8mm motion pictures in 1962 at Columbia University, took part in the deliberations.



Four past presidents of the Department of Audiovisual Instruction were present for the Conference. Dr. Mendel Sherman of Indiana University, Dr. Paul Witt of Columbia University, Dr. Charles Schuller of Michigan State University (Dr. Schuller has been the chairman of the Film Clip Project) and Dr. James Brown of San Jose State College all provided leadership at the Conference.

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Small group sessions were designed to provide every Conference participant with the chance to express his concerns and ideas on the subject of cartridge films.

Julien Bryan of International Film Foundation makes a point during one of the breaks.

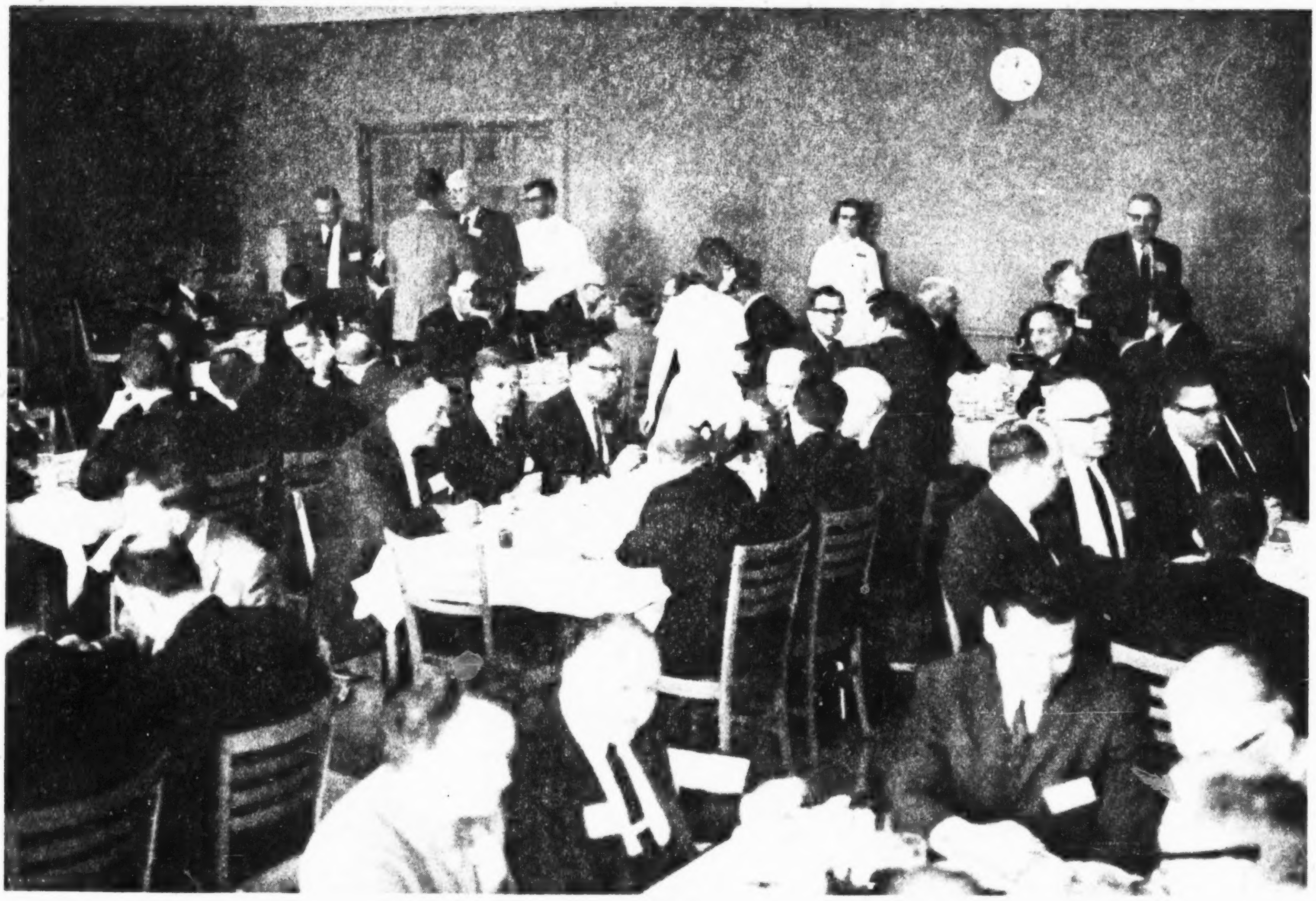
Informal dialog was the order of the day at coffee breaks and social hours. Salvatore Daccurso of the Jayark Instrument Corporation and Charles Schuller discuss a point "over the cup."

The Michigan weather....ah well, the less said the better!

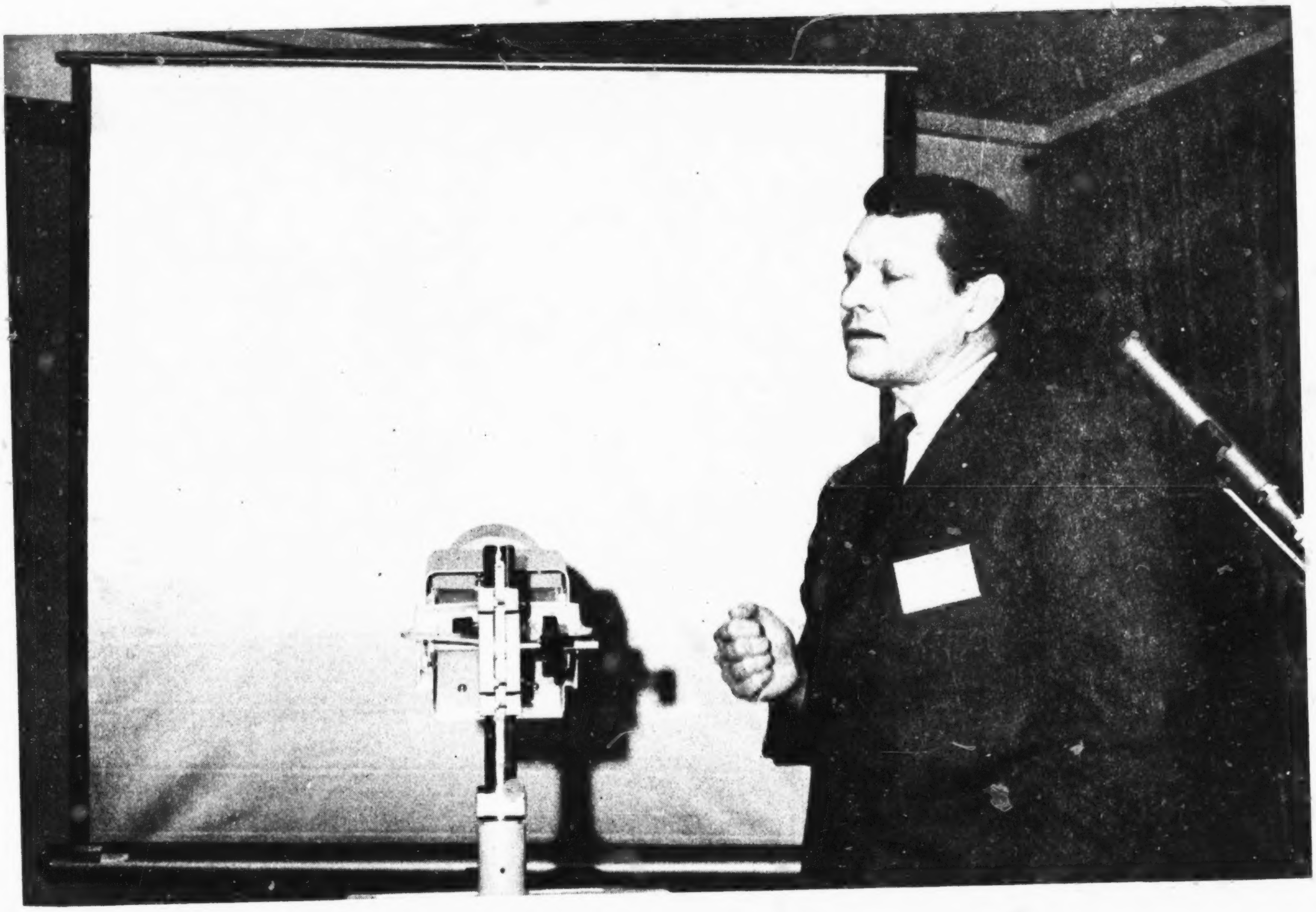
Dr. James Page, Director of the Instructional Materials Center in the College of Education at Michigan State served as the Director of the Film Clip Project during its initial year.

Bob Suchy of Milwaukee discourses with Dr. Erling Jorgensen of the Closed Circuit Television system at Michigan State University. Mr. Suchy was the Conference summarizer and did a yoeman job entertaining the group at the final luncheon, as well as adding a dimension to the meeting that was thoughtful and appreciated.

Professor Edward McCoy of Michigan State visits with Kenneth Norberg of California, President of the Department of Audiovisual Instruction of the National Education Association.



Lunch time.



Dr. Robert Wagner of Ohio State University presented one of the major papers at the Conference. The paper is reproduced elsewhere in this publication

A conference is only a conference, but a good cigar is a good cigar!

Rick Margoles, graduate student at Michigan State University gets some late information from Dr. John Childs of Wayne State University.

THE CONFERENCE PAPERS

Each of the following papers was presented to the conferees during the February meeting in East Lansing. These papers were presented before the discussion sessions in order to provide more information for the delegates. Each is reproduced with the permission of the author.

CHAPTER V

PROMISES AND PITFALLS

A PAPER

Presented to the National
Department of Audiovisual Instruction of the National
Education Association

and

To Keynote the
National Conference on Cartridged Films
February 22, 23, 24, 1967

By

Dr. Elwood E. Miller, Project Director
and
Mr. Charles G. Bollmann, Assistant Project Director

While standing in a camera store recently I observed a young salesman, somewhat immature in both years and experience, attempting to sell a customer on one of the Technicolor 8mm cartridge machines. The young man said, "This is the latest idea in home movies--it is called a _single conception projector_."

Althought I chuckled about the use of the term "single conception," actually the "conception" of the single concept film is an accomplished fact. Perhaps we are in a period of "gestation," and our real concern lies in the final form the infant will exhibit when some of the "pitfalls" are identified.

Michigan State University, through the facilities of the Instructional Media Center, arranged a contract with the U.S. Office of Education in 1964 to spend twenty-four months investigating the single concept field, and more particularly, ways of retrieving large amounts of existing filmed material suitable for use in the single concept format. As a result of this contract, we are presenting to you this report, "Promises and Pitfalls."

Time magazine of April 1, 1966 contained an article in the education section on Project Discovery. Project Discovery is a joint effort of the Encyclopaedia Britannica film group and the Bell & Howell instrument organization. The two major points illustrated by the Time article are: First, the complexity of equipment for managing motion pictures in classroom situations. Second, the difficulty in obtaining--at the right time in the right place--for the right purpose--the right piece of film: In many cases, teachers identify films as being too complex or containing too much information.

We feel that film clips do teach _to the point_, and that, if they can be made easily available to the teachers, significant changes might happen in teaching patterns and in learning experiences for young people.

We're concerned about the complexity of hardware to present the motion picture image and about the red tape involved in securing a given piece of film for an instructional situation. And so the twin problems of film accessibility and machine complexity need to be hurdled in order to bring motion pictures in classroom situations to a level never before possible. We believe the overcoming of this dual problem could significantly influence instructional patterns in the future.

The introduction of two 8mm projectors, the silent, cartridge-fed 8mm projector by Technicolor, and the sound, cartridge projector by Fairchild, also in 8mm format, were significant strides in overcoming the problem.

It is our belief that the most valuable component of these two systems is the cartridge itself. The cartridge idea is not really new, but nevertheless we are convinced that the use of a simple, cartridge loaded machine represents a real breakthrough.

What is a single concept film? The term is somewhat unfortunate as far as the psychologists and learning theorists are concerned, but for purposes of our report we shall define it as a segment of film with a short, describable instructional content. We are very excited about the idea of cartridged single concept films, and we would like to share with you, in this report, some of our findings as well as the excitement that we feel as we speculate about the single concept idea.

The purposes of the Film Clip Project were threefold. The first, and perhaps major purpose, was the identification of excerpting procedures and the creation of a sizable excerpt collection. We recognized from the beginning that perhaps the best way to make single concept films was to identify an instructional problem, design and shoot the film from "scratch." However, in order to rapidly accumulate a large library of this kind of material, we recognized that we needed a way to get around "original production." There simply wasn't time to build a library of the thousands or perhaps tens of thousands of clips really needed to complete the idea. Our agreement with the U.S. Office of Education charged us with studying existing 16mm motion picture footage in some quantity, and analyzing it for possible excerpts which could be used in the single concept format with a manageable amount of editorial treatment.

Our second charge by the U.S. Office was to investigate and design an information retrieval scheme capable of keeping track of the film clips and getting at them with a minimum of difficulty. Information retrieval is a general problem in all of the educational community today, and our problems are really no different. Since we can envision in the near future tens of thousands of titles available in this format, it will be necessary to have an efficient method of getting at a particular piece of film when it is needed.

Thirdly, we were interested in equipment developments in the field. We will cover this a little more thoroughly, later in the report, but we are quite concerned with the developments of hardware to handle the single concept films.

The three phases of the report will be coupled together to generate a report for the U.S. Office of Education which will be filed sometime in the near future.

Our procedures on the project can be described briefly as follows: There are 25,000 to 30,000 identifiable educational films marketed today in this country. From these thousands of films, from scores of producers, we selected films that we felt we could work with. We found we were limited somewhat by the kinds of people we could employ to make decisions on appropriate footage for excerpting. Available films and "willing producers" also limited, to some degree, the investigation.

Our contract with the U.S. Office specified that we were to work in three subject matter areas. We chose the sciences, social sciences and foreign languages.

We followed these specific procedures: The film was first selected from the catalogue of one of the producers cooperating with us on the project. A search was made of the film in order to identify segments that might be appropriate in the single concept mode. For the clip search we used Moviola library readers in order to facilitate the work through the random speed feature of this machine.

The clip was then actually cut and removed from the film and respooled on a small plastic spool. Some time lapsed before the film was again examined by one of the excerpters. The excerpters were all graduate level, advanced degree students at Michigan State University. We felt it important that the excerpter see the film clip after a time lag of at least a week, and see it out of context before further decisions were made. If after seeing it out of context, the excerpter thought it could be edited into a usable clip, he then proceeded with an informational form suggesting both visual and sound track editorial treatments.

A treatment sheet was then written by the excerpters, containing information to the producer on editorial suggestions, a descriptive paragraph and, suggested uses for the film clip. The descriptive paragraph was important because it led us into another important phase of the project, information handling.

Our librarian examined several schemes previously devised for organizing the kinds of information that we would need in order to secure from a bank or repository of clips any one clip at the proper time. We assumed that most teachers would not see the clips or preview them before their use; therefore, a descriptive paragraph was written for the clip. It is our feeling that the teacher would be safe in using this film in given situations having only studied or read the descriptive paragraph ahead of time. It is not practical to assume that teachers will preview these thousands of film clips before they are actually used in classroom situations or assigned for individual study.

We looked at a conventional index filing system and organized one using the information derived from several hundred clips we identified in the project. There are some advantages to conventional index filing, in that people are familiar with standard library-type filing systems. There are some disadvantages, in that once it achieves a certain size it becomes awkward. We are still experimenting with several systems and hope to receive permission from the U.S. Office of Education to continue this part of the investigation for another year.

We devised an IBM card based, coordinate index, or "peek-a-boo" system. This is one that we feel might potentially have some real importance in the single concept field. The final report of the project will carry a detailed description of the library schemes evolved in the investigation. The goal is to conceive an index whereby a minimum of effort could lead a person to the proper film on a rack or in a repository of films.

Although we have several hundred rough cuts, it should be obvious that we would not "editorially treat" all of the clips for silent use because of the research nature of the project and because of the expense involved. Nevertheless, we have given complete editorial treatment to a few film clips that were identified and treated for silent use.

Sound clips were not given the full treatment because in most cases only titles, credits and closings would have been necessary. Occasionally a new sound track was suggested, but this treatment necessitates more laboratory facilities than we had available at Michigan State.

The major findings can be summarized briefly as follows:

1. Excerpting is feasible where good existing films are concerned. We realize there are many problems yet to be resolved, but many of these can be handled by film producers working on a large quantity basis.

2. We have addressed ourselves to the question of correlating the quality of single concept excerpts with the quality of the original film. We would generalize on this question by stating that excerpting does not seem to alter the original nature of the film. If it was a well-produced, carefully written and edited film to begin with, the excerpts tend to be good excerpts. The reverse is also true.

3. There are cost factors involved in excerpting. We will have some generalized production cost statements in the final report; however, costs are a function of volume, and much work will have to be done by those interested in marketing films before they can resolve the cost question. Editing always is a function of cost in any type of filmmaking. It is no different in the production of excerpted, single concept films.

4. There has been a great deal written about the inadvisability of coupling a sound track to the visual track of a single concept film. We feel that there is a need for both silent and sound track, either as it appears on the original film, or on some amended version. About half are perfectly usable with a

reasonable amount of visual editing in the silent format. We are convinced that the provision of equipment with sound capability will in effect double the potential number of clips available from existing films if and when film producers decide to excerpt their films.

5. Information secured from an IBM analysis of data sheets on the project yielded noteworthy information about the film clips. We find on the average that an instructional film will produce about 3¼ clips. The length of the clip seems to be in a two to three minute area. We deliberately did not require our people to select clips to fit a certain film format or cartridge size. We asked them to identify the idea, select the clip or make the clip from a group of excerpts to address itself to a single idea. If it takes 10 minutes, and if it can be done in 30 seconds, fine, but the film length was decided by the basic instructional idea being dealt with. And yet, in our IBM print-out sheets we find that 2/3 of all clips selected fall in the two to three minute category.

We were interested in the number of lines and words per summary because of the information problem and our belief that ideally it should be available on the cartridge itself. We found that the average summary is 12 lines long and contains approximately a hundred words.

How many key words or terms per summary were identified? The IBM analysis tells us that the average is 8 key terms per summary. These key terms were used as entries in the indexing system.

Where did we find clips in existing films? Based upon a five segment categorization of the films, 16% of the clips were found in the first 1/5 of the film. Twenty per cent in the second 1/5, twenty-three per cent in the middle 1/5, twenty-two per cent in the next 1/5, and nineteen per cent in the last 1/5. I think we would have hypothesized at the beginning of the project that we would find more clips in the introductions and summaries than in the body of the film. The reverse seems to be true.

Obviously, there are many other findings of a lesser nature that are not described in this report, but those findings will be included in the final printed report that will eventually be submitted to the U.S. Office of Education.

RECOMMENDATIONS:

As a result of out study, a number of recommendations can be made. First, we might comment on the selection of the professional "decision" makers. In the judgment of those on the project, those people selected by film companies to excerpt their existing motion picture footage should have two general types of abilities:

1. They should be competent in their subject matter field. This is relatively obvious and we are totally convinced, for example, that only a science major can excerpt science films.

2. We believe that, in view of the fact that these excerpters are really making decisions for teachers and decisions for students, they should have some sensitivity to and some experience in the teaching and education field. We suggest experienced teachers competent in a subject matter area be used to make the excerpting decisions.

Second, we are greatly concerned about the film formats in the educational motion picture field of today. There are three formats: (1) The super 8, (2) the standard 16mm, and (3) the standard 8. There are, also, two types of sound management prevalent: The optical or magnetic sound. We have no "axe to grind" about any of the three general formats. We have no bias or preference between optical or magnetic sound. Our only concern is a genuine fear that the single concept cartridge film idea will never really "get off the ground" until such time as some reasonable standardization of format is done within the industry itself. So we would plead with those of you who represent industry to resolve this dilemma.

Perhaps it isn't even necessary to standardize on one single format, but it certainly is necessary to reduce the number of formats that are being considered today. Several others, in addition to the three listed above are in existence. There is a 70 millimeter format, and there are some double 16mm formats. Many of these differing systems contain a lot of good ideas, and yet those of us in education who have to spend tax dollars will have to use some judgment on buying equipment that will fit quantities of film and buying films that will fit existing equipment. The question of inter-changeability of films between cartridges, and cartridges between machines must be studied and eventually resolved.

Again, let me reiterate--we're not an 8mm project, we're not a 16mm project; we are a project concerned with the management of ideas for instruction in the film media.

Third, if we were asked to recommend very briefly the kind of equipment we would like to see developed, it could be described as follows:

We think it should be capable of running at both conventional sound and conventional silent speeds. It obviously should be simple and lightweight. It should have a sound capability. You can always have a silent machine by turning off the sound button. It should be designed with a specific audience in mind. If it is to be a classroom projector, it should be designed to function in that kind of learning situation. If it is for individual study or learning, perhaps a different design can be used. We think one of the prime needs is for equipment to have the ability to reproduce sound as well as images.

If you were to manufacture these machines, what would they need to sell for? We are convinced that in the $150 to $200 dollar price range you would sell vast quantities of the equipment. This figure represents less than half the cost of present 16mm equipment (or 8mm sound machines), and it represents perhaps something in the neighborhood of twice the cost of 8mm silent equipment. This is a compromise in a sense, but we would speculate that school administrators would buy quantities of equipment if it were in this price bracket.

Fourth, we would make recommendations on the cost of films themselves. We would like to see them competitive with reference material in libraries. School districts and budget review boards tend to look askance when you ask for $150 films. When you ask for a $10 book there's no problem. We would like to see these in the same general price category.

What does information of this type cost now? Sound film strips cost 50 cents per minute of material. Silent 8mm film clips sell at $5 per minute of material, and 16mm sound film at $10 per minute. These are not production prices but are market prices to the consumer. We would like to see a $10 cartridge sound film of the 3 to 4 minute length indicated earlier in the report.

SPECULATIONS:

The nature of our investigation is one that requires considerable speculation, in that there isn't a lot of concise and analytical data that can be scientifically organized. The nature of the field necessitates some "hypothetical hunching." What kinds of things might happen if the single concept idea really developed into a major part of the audiovisual field? Perhaps filmed encyclopedias might develop. Several film production companies that we have visited have expressed an interest in a single concept film reference library.

We would speculate that until a very high volume is reached, both in hardware and films, the prices indicated in the above paragraphs will not come about. In the American business community, price is primarily a function of market volume. Single Concept films can be a high volume item leading to very reasonable prices.

We would like to see the equipment placed within departments in schools, and within grade levels, and even, perhaps, within rooms in certain instances. It is not unreasonable to supply a teacher with a projection device of the type visualized in this report. Collections of films placed within buildings or within departments and perhaps even within grades, would be a corollary to equipment accessibility.

One of the exciting speculations concerns individual learning with individual study carrels. This kind of material should be available for youngsters to study at their own pace in libraries or instructional material centers. This is not a new idea. It is already being done in many cases, and it is quite exciting.

We think it is even possible that these could eventually be retailed locally (as are paperback books) so that youngsters working in chemistry could pick up a set of clips at their bookstore or corner school supply center and study on their own in their own homes. (Could they even be a part of a home entertainment center?)

In summarizing the report, we must again emphasize the interdependency between the film and the hardware. One cannot grow without the other. We would suggest to those of you in industry that each leans heavily upon the other, and that therefore, you must cooperate in the development of the single concept field.

We think of the interdependency of equipment and films, then volume and prices, as the old "chicken and egg problem." Perhaps it can be broken by the excerpting route. Large volumes of film are necessary, and we think large volumes of very adequate film can be retrieved from existing motion picture film. We think that the more film clips are used the more likely it is that traditional films will be used. We think the conception of the single concept idea was an interesting and very important one. We're anxious to see it grow to maturity. We think that teachers must and will learn to use this kind of filmed material in different and newer ways than they are presently using film. Those of you in industry must help to solve some of the problems, some of the pitfalls that we have suggested.

In a very general sense, the four areas that we think single concept films fit into very nicely are: First, classroom instruction, the illustration of principles and the like; second, individual instruction in library situations; third, illustrative support in television programing, and fourth, and perhaps the most exciting, their place within the programing concept. Programing is being done today almost totally in verbal methods and it is obvious to educators that verbalization is not enough in programing. We think single concept films should occupy some of those frames now held by verbal descriptions.

Educators do not need to be convinced of the teaching power of the film medium. We are excited and sold on the single concept film idea, and we would plead that industry and education cooperate to hurdle the numerous "pitfalls" in order to reap the benefit of the "promises" of single concept films.

Our last question is, does this represent the end of a presentation, or the beginning of a new mode of instructional use for films?

CHAPTER VI

BIRS: A SYSTEM OF GENERAL PURPOSE COMPUTER PROGRAMS FOR INFORMATION RETRIEVAL

John F. Vinsonhaler

Typically, computer users draw little distinction between computer hardware and software. Most scholars and scientists are so thoroughly occupied with their own disciplines that they find little time to learn the intricacies of computer programming. For such individuals, the usefulness of any particular information processing system is as much limited by the availability of general purpose programs as by the computational power of the system. Thus, collections of general purpose computer programs are of enormous significance in computer applications. Collections of general purpose computer programs have been extensively developed in the area of data processing by such researchers as Cooley and Lohnes (1962), Dixon (1962), Tryon and Bailey (1966), etc. Currently, such general purpose systems are being developed in other areas of computer application, including Information Retrieval. Unfortunately, most of the Information Retrieval (IR) Systems are of rather limited generality. While a vast array of IR programming systems are currently in use (Berul, 1964), most are special purpose systems, i.e., they are based upon single methods of developing IR Systems, designed for implementation at particular computer installations, etc. For example, while Key-Word-In-Context (KWIC) programs are generally available at most computer installations, such programs are limited to the development of IR Systems based upon permuted author-title printed index. Similarly, while the INFOL System (CDC, 1965) or the Rand Catalogue System (Kay and Ziehe, 1965) can be used to develop a variety of IR Systems, both collections of programs are designed for implementation on a particular type of computer.

A few systems of general purpose programs are currently available in the area of Information Retrieval. To begin with, Janda (1966) recently released TRIAL, a general purpose IR System specifically designed for the retrieval of abstracts of documents punched on cards without internal organization, by means of traditional logical searches also punched on cards. Another somewhat more general IR programming system is the Generalized Information System (GIS) now under preparation for the IBM 360 Series of Computers (IBM, 1965).

The GIS provides an extension of TRIAL in that the GIS is capable of searching specific portions of abstracts and may be easily used to generate printed indexes for collections of information. However, GIS is designed for a particular line of computers, whereas TRIAL is designed for any computer utilizing FORTRAN, the most commonly available programming language.

At present, there appears to be only one system of truly general purpose computer programs for Information Retrieval in the behavioral sciences: The Basic Indexing and Retrieval System (BIRS). Essentially, BIRS is a set of fundamental programs designed to allow scholars and scientists to use their own locally based computer to construct and maintain a variety of IR Systems. Thus, BIRS may be viewed as a set of essential IR tools. The research worker may use these tools to construct the type of IR System which best meets his immediate needs.

In general, BIRS may be adapted to the development of any IR System having the following characteristics: First, each of the informational elements (e.g., documents, summaries of documents, references to documents, etc.) retrieved by the IR System must be punched on cards. Second, for purposes of indexing or retrieval, each of these informational elements must be describable by a collection of terms (e.g., a set of key-words indicating the topical content of the element, etc.). Within these rather broad limits, BIRS may be used to construct and maintain a variety of IR Systems ranging from computer generated books with author/subject indexes, to computer based searching and retrieval systems with automated retrieval of informational elements in response to users' questions.

The development of BIRS has particularly emphasized three major characteristics which have proved especially important for general purpose systems: portability, simplicity, and adaptability. Portability refers to the ease with which BIRS, or IR Systems based upon BIRS, may be transferred from one computer installation to another. In general, such systems should be easily implemented at most university computer centers, since BIRS is written entirely in a FORTRAN IV level language, and uses the minimum storage configuration generally available in scientific computer centers: 32,000 words of core storage and six tape drives. The form of BIRS described in the present report is currently implemented on the Control Data Corporation 3600 at Michigan State University. Implementations of the system at other installations are now in progress. Simplicity refers to the ease of using BIRS or IR Systems based upon BIRS. In order to be of maximal value in education and behavioral science, BIRS should be easily used by any researcher, regardless of his technical background in IR or computer science. Accordingly, the system is constructed to handle IR processing in the most straightforward manner with a minimum degree of control required of the user. In addition, a comprehensive Technical Manual (Vinsonhaler, 1966) has been developed for the system which provides a background reading in IR, and thorough descriptions of all programs. Adaptability refers to the degree to which individual scholars may adapt the system to their own purposes. This characteristic is of particular importance in educational and behavioral science IR, because of the diversity of informational needs and the necessity for experimentation with various types of IR methods within these fields. Adaptability implies both ease of modification and flexibility of use. Ease of modification is designed into the system by using so-called "open-ended, modular" construction and by organizing the programming according to Vickery's (1965) theoretical analysis of IR Systems into independent clusters of dependent operations. Thus, each program in BIRS performs a separate basic operation and may be modified or replaced without major changes in the remaining components of the system. Flexibility is built into the system by (1) completely automating only those clerical operations common to most IR systems; (2) allowing the user to control the operations which are nonclerical and dependent upon his particular IR needs; and (3) providing the user with a choice among programs and among methods within a single program.

THEORY

Most currently functioning IR programming systems are designed to implement rather specific types of IR Systems (NSF, 1966). Hence, such systems are developed *ad hoc* with minimal theoretical foundations. In contrast, BIRS is designed to implement many types of IR Systems. Consequently, an attempt has been made to establish an explicit theoretical basis for the methods used in developing the system.

The general design of BIRS is based upon an extension of Vickery's (1965) theoretical analysis of IR Systems. Essentially, this theoretical model is an abstraction of the functioning of most traditional libraries, and provides a basis for systems like BIRS, which permit users to develop automated or partially automated IR Systems, which are firmly based upon familiar traditional-library methods.

The fundamental theoretical model for BIRS is summarized in Table 1, and is discussed at length in the Technical Manual for the system (Vinsonhaler, 1966). A complete discussion of analogous IR System models is also available (Fossum, 1966).

The BIRS theoretical model assumes three types of fundamental informational elements: abstracts, descriptions, and questions. Three fundamental operations are associated with these elements: information storage, indexing, and retrieval. These basic operations may be clarified by analogy with traditional library operations. Information storage corresponds to the maintenance of the collection of books and periodicals in the traditional library, i.e., the storage of documents for retrieval by access label or "call number." Information indexing corresponds to the maintenance of an index to the contents of the library, i.e., the maintenance of author, title, or subject catalogs. Finally, information retrieval operations are analogous to the process of searching author-title, or subject catalogs for the "call numbers" of relevant documents, and then retrieving the documents, themselves, by means of their "call numbers."

Essentially, BIRS is an open-ended collection of independent computer programs organized according to this general theoretical model. Thus, the system includes a separate set of computer programs for each of the three fundamental operations of information storage, indexing, and retrieval. Each component program is designed to aid the user with a single fundamental operation. To construct a particular type of IR System, the user simply selects the proper component programs. The main advantage of this "modular" design is flexibility. Since the fundamental operations are mutually independent, the component programs may be used or modified independently. Hence, different components may be combined in various ways to produce a variety of IR Systems. Similarly, the entire system may be selectively modified by replacing existing components (or adding new ones) for one fundamental operation--without any modification of components designed for other basic operations.

TABLE 1: Fundamental Operations Performed by IR Systems

OPERATION	DESCRIPTION
INFORMATION STORAGE	These operations are concerned with the preparation and storage of the basic informational elements to be processed by the system.
ABSTRACTING	Abstracts (a) are defined as basic informational elements, e.g., summaries of documents. This process consists of the preparation of abstracts for input to the IR System.
INFORMATION FILE MAINTENANCE	Information files are defined as collections of abstracts. The contents of the file are sets of the form $<L_a,a>$, where a denotes any abstract and L_a denotes a unique label or access number for the abstract. This operation consists of preparing or updating the file, so that abstracts may be located by means of the unique access labels.
INFORMATION INDEXING	These operations are concerned with the preparation and storage of descriptions of the topical contents of abstracts.
ANALYSIS	Descriptions (d_a) are defined as topical descriptions of abstracts, which are to be used to locate abstracts by subject content, e.g., sets of key-words. Analysis is concerned with the preparation of descriptions for each abstract in the Information File.
DESCRIPTION (INDEX) FILE MAINTENANCE	Description files are defined as indexes to information files, i.e., collections of descriptions and labels of the form $<d_a,L_a>$. These files provide a link between topic descriptions (d_a) and abstracts (a) by means of the unique access labels. The operations consist of preparing or updating the contents of the index.
INFORMATION RETRIEVAL	These operations are concerned with the retrieval of abstracts stored in the information file $<L_a,a>$, by means of descriptions stored in the index or description file $<d_a,L_a>$, in response to questions (q) submitted by users.
QUESTIONING	Questions are defined as requests for abstracts by topic. A question (q) is a description of a class of abstracts, e.g., a set of key terms defining the type of information of interest. Questioning refers to the process of stating such search requests.

TABLE 1 continued:

SEARCHING	Searching refers to the process of using the description file to locate relevant abstracts. Thus, searching includes reading questions (q), comparing questions and descriptions (q,d_a), and storing the locations (q,L_a) of relevant abstracts.
RETRIEVING	Retrieving refers to the process of reading relevant abstracts from the information file, i.e., using the results of searching (q,L_a) to output relevant abstracts, (q,a).

The fundamental operations performed by BIRS are summarized in Table 2. As indicated in the table, the preparation of abstracts and questions must be performed by the user. All other fundamental operations may be performed by the user, performed by the user aided by BIRS, or performed entirely by BIRS, under the control of the user.

The preceding discussion provides only a brief summary of the general theoretical foundations of BIRS. Each component program in the system rests upon more specific theoretical considerations, which are fully discussed in the Technical Manual (Vinsonhaler, 1966).

THE SYSTEM

The initial version of the Basic Indexing and Retrieval System (BIRS/I) is now fully operative on the CDC 3600 at Michigan State University. Essentially, BIRS/I is designed to generate IR Systems using the so-called method of "coordinate index"--descriptions of abstracts are limited to unordered sets of key descriptive terms. This initial system has been implemented on two types of CDC 3600 configurations and has been used to generate a variety of IR Systems. We are now ready to begin implementing BIRS/I on other types of computers.* We do not expect to encounter major difficulties, since all programs are written in a FORTRAN IV level language and require modest storage facilities (32,000 words of core storage and three tape drives).

The computer programs included in BIRS are each designed to perform one of the three basic operations of IR Systems described in the previous section. Table 3 summarizes the functions performed by the seven programs included in the initial system, BIRS/I.

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*Copies of BIRS/I and the Preliminary Technical Manual (Vinsonhaler, 1966) are available at cost from the Learning Systems Institute, 201 Erickson Hall, Michigan State University, East Lansing, Michigan, 48823.

TABLE 2: Fundamental IR Operations Performed by BIRS

OPERATION	PERFORMED BY USER	AIDED BY BIRS	PERFORMED BY BIRS
Information Storage			
Abstracting	Yes	No	No
Information File Maintenance	Yes	Yes	Yes
Information Indexing			
Analysis	Yes	Yes	Yes
Description File Maintenance	Yes	Yes	Yes
Information Retrieval			
Questioning	Yes	No	No
Searching	Yes	Yes	Yes
Retrieving	Yes	Yes	Yes

Briefly, BIRS/I includes a minimal collection of component programs covering the three major operations. Thus, one program (IFMP) is provided to aid the user with information storage; three programs (DAP, DFMP, PIP) are provided for information indexing; and two (DFSP, IFRP) are provided for information retrieval. Finally, one additional program (EXEC) is provided to aid with the manipulation of the system as a whole, e.g., to call components into operation from the system library tape.

In constructing any particular IR System with BIRS, the researcher may utilize various types of cards, tapes, and printed reports. The cards, tapes, and reports used or generated with the system may be classified according to the fundamental IR System operation which they serve.

Table 4 summarizes the main card input for IR Systems developed with BIRS/I. As shown, abstracts, descriptions of abstracts, and questions are all input on cards. The abstract and question cards must be prepared by the user. The descriptor cards may be prepared by the user or by BIRS programs.

It should be noted that not all of these types of cards are needed for all applications.

Table 5 summarizes the tapes which may be used with IR Systems developed by BIRS/I programs. As with component programs and cards, each tape is concerned with one of the major IR operations: The IFT contains abstracts, the DFT contains descriptions of abstracts, and the QFT contains questions and the access numbers of abstracts relevant to the questions.

As before, not all IR Systems will require the use of all tapes. In general, only completely automated systems require all tapes. Partially automated systems replace tapes with printed reports.

Table 6 summarizes the printed reports used with IR Systems developed from BIRS/I programs. As indicated, each type of report is mainly concerned with one of the three major operations.

TABLE 3: Component Programs of the Basic Indexing and Retrieval System (BIRS/I)

OPERATION	PROGRAM	FUNCTIONS
Executive	EXEC	The Executive Program is designed to store and retrieve component programs comprising BIRS.
Information Storage	IFMP	The Information File Maintenance Program is designed to read informational elements from cards, assign a unique access number to each element, and store the element on the Information File Tape (IFT), so that the element may be retrieved, given its access number.
Information Indexing (Descriptive Analysis)	DAP	The Descriptive Analysis Program is designed to aid the user with the task of indexing or classifying informational elements. In general, DAP reads informational elements either from the IFT or from cards and searches them for key words. Thus, DAP may be used either to perform a word frequency analysis or to automatically index informational elements.
Information Indexing (Description File Maintenance)	DFMP	The Description File Maintenance Program is designed to read decriptions (i.e., sets of indexing terms) and access numbers of informational elements from cards and store them on the Description File Tape (DFT) to provide an index to the contents of the Information File Tape (IFT). The user may manually generate the card input for the DFMP, or use either the IFMP or the DAP, to aid him with this task.
Information Indexing (Printed Indexing)	PIP	The Printed Indexing Program is designed to prepare a traditional author or subject index using informational elements read from cards or from the IFT, or using descriptions read from cards or from the DFT. The IFMP may be used in

		conjunction with this program to generate a listing of informational elements organized by access number.
Information Retrieval (Automated Searching)	DFSP	The *Description File Searching Program* is designed to read requests for particular types of informational elements (stated as sets of key terms) from cards, to search the DFT for relevant informational elements, and to store the access numbers of the most relevant elements on the *Question File Tape (QFT)*.
Information Retrieval (Automated Retrieval)	IFRP	The *Information File Retrieval Program* is designed to read requests and access numbers of the relevant informational elements from the QFT, retrieve the corresponding informational elements from the IFT, and print both the requests and the relevant informational elements for the user.

TABLE 4: Cards Used with Component Programs of BIRS/I

OPERATION	CARD TYPE	FUNCTION
Executive and Control	BIRS Control Cards	Control cards are used to select component programs and govern their operations. Each card is punched with a *$ in the first two columns, followed by a control phrase. For example, cards calling the IFMP would contain *$IFMP.
Information Storage and Indexing	Abstract Cards	Abstract cards are used to input informational elements to be processed by the system. An abstract may consist of any set of information punched on from one to fifty cards. Each abstract is identified by a unique "access number" or "label," normally assigned by BIRS programs under the user's control. The following is an example of a very simple abstract punched on cards. *$ABSTRACT "LABEL" BENNETT, G.K., BENNETT, M.G., WALLACE, W.L., AND WESMAN, A.G. COLLEGE QUALIFICATION TEST. PSYCHOLOGICAL CORP. GENERAL INTELLIGENCE FOR COLLEGE ENTRANTS AND ADULTS. SIXTH MENTAL MEASUREMENTS YEARBOOK, O.K. BUROS, GRYPHON PRESS 1965, ENTRY NO. 450. TEST LIBRARY NO. C1033.
Information Storage and Indexing	Descriptor Cards	Descriptor cards are used to input topical descriptions of abstracts for further analysis. Descriptions are sets of key terms describing the topical content of abstracts. Each abstract is separately described by a set of up to 30 terms, identified by means of the "label" or access number of the abstract being described. Terms are separated by commas, and the latter portions of long terms are ignored. There are no other restrictions on the content of terms.

		Descriptor cards may be generated by the user or by BIRS/I programs. The following is an example of a description of the abstract given above. *$DESCRIPTOR "LABEL" BENNETT, WALLACE, WESMAN, COLLEGE, QUALIFICATION TEST, PSYCHOLOGICAL CO, GENERAL, INTELLIGENCE, ENTRANTS, ADULTS.
Information Retrieval	Question Cards	Question cards are used to query automated IR Systems developed with BIRS/I, i.e., to request that component programs search for and retrieve abstracts relevant to given topics. Question cards are used to indicate the topics of interest. Each search request is indicated by means of a set of up to 30 terms, separated by commas. The following is an example of a request for abstracts dealing with general intelligence for adults. *$QUESTION GENERAL, INTELLIGENCE, ADULTS

TABLE 5: Tapes Used with Component Programs of BIRS/I

OPERATION	TAPE	CONTENTS AND FUNCTION
Executive	BIRS Library	The BIRS Library Tape contains component programs of the system. The programs are read from cards and stored on the tape by the Executive Program. Programs may be called from the tape by means of executive control cards.
Information Storage and Retrieval	IFT	The Information File Tape contains abstracts read from cards and stored so that each can be located given its unique access number or "label." The IFT is generated by the IFMP and is used by the DAP, the PIP, and the IFRP.
Information Indexing and Searching	DFT	The Description File Tape contains key-term descriptions and access numbers or "labels" of abstracts. Descriptions and "labels" are associated so that abstracts may be located by topical content. The DFT is generated by the DFMP from descriptor cards prepared by the user, or by the DAP. The tape is used by the PIP, and the DFSP.
	QFT	The Question File Tape contains questions read from question cards, and access numbers of relevant abstracts. The QFT is generated by the DFSP and is used by the IFRP.

TABLE 6: Printed Reports Used with Component Programs of BIRS/I

OPERATION	REPORT TYPE	CONTENTS AND FUNCTION
INFORMATION STORAGE	Printed Information File	This report consists of a printed equivalent of the Information File Tape, i.e., a listing of abstracts printed in numerical order of access number. The printed Information File is generated by the IFMP from abstract cards or from the IFT.
INFORMATION INDEXING	Content Analysis Report	This report consists of a content analysis of word usage in abstracts, read either from cards or from the IFT. The report is generated by the DAP, which also may be used to automatically index each abstract by selecting key terms and punching them on descriptor cards.
	Printed Index	This report consists of a printed equivalent of the Description File Tape, i.e., an index for locating abstracts by topic. Since this index is designed for manual searching, a term-entry index is prepared. That is, all key-terms are printed in alphabetical order and each term is followed by the "labels" or access numbers of abstracts relevant to the term. The printed index is produced by PIP from abstract cards, the IFT, descriptor cards, or the DFT.
INFORMATION RETRIEVAL	Abstracts relevant to questions	This report consists of the results of an automated search performed by the DFSP. Each question originally stated on cards is printed and following it the relevant abstracts--in order of relevance. The report is generated by IFRP from the QFT and IFT.

As before, different types of IR Systems will require the use of different types of printed reports. Thus, systems emphasizing manual searching and retrieval will require the use of a printed information file and a printed index, while automated searching and retrieval systems will require printed reports containing abstracts relevant to specific questions.

To summarize the preceding discussion, BIRS is essentially a general purpose indexing and retrieval system. It is designed to permit the construction of IR Systems which locate summaries of more complete documents stored in auxiliary files. Thus, IR Systems developed with BIRS are analogous to the reference services offered by traditional libraries. Thus, BIRS/I programs may be used to produce a printed equivalent of the author-title, subject index or an automated approximation to the reference-librarian.

APPLICATIONS

To clarify the preceding brief description of the Basic Indexing and Retrieval System, let us consider a concrete example of the use of the initial system, BIRS/I, in connection with a recently completed demonstration project at Michigan State University. The purpose of the project was to establish a computer based library of all psychological tests, currently in print, which are purported to measure general intelligence. To implement the library, a list of tests was compiled from major reference works on currently published standardized psychological tests (Buros, 1961; 1965). Next, specimen sets for all tests were purchased and stored in the College of Education at Michigan State University. Finally, brief abstracts were prepared for all tests. In general, each abstract included such information as principal author's name, title, publisher, etc. In addition, each abstract provided cross references to major reference works on psychological testing and to the sample test kits stored in College of Education files. The abstracts were punched on cards as illustrated in Table 4 of the preceding section.

We have experimented with a number of BIRS/I generated IR Systems for this test library. For the purpose of the present discussion, we shall describe only two applications: the development of a printed author-title catalog and an automated reference service for the test library.

The printed author-title catalog is essentially an indexed book describing all tests included in the library, which is made available to users of the library. The catalog includes abstracts of all tests with a traditional author index and a subject index produced by permuting key words obtained from each abstract. The steps involved in generating such an indexed book are summarized in Figure 1.

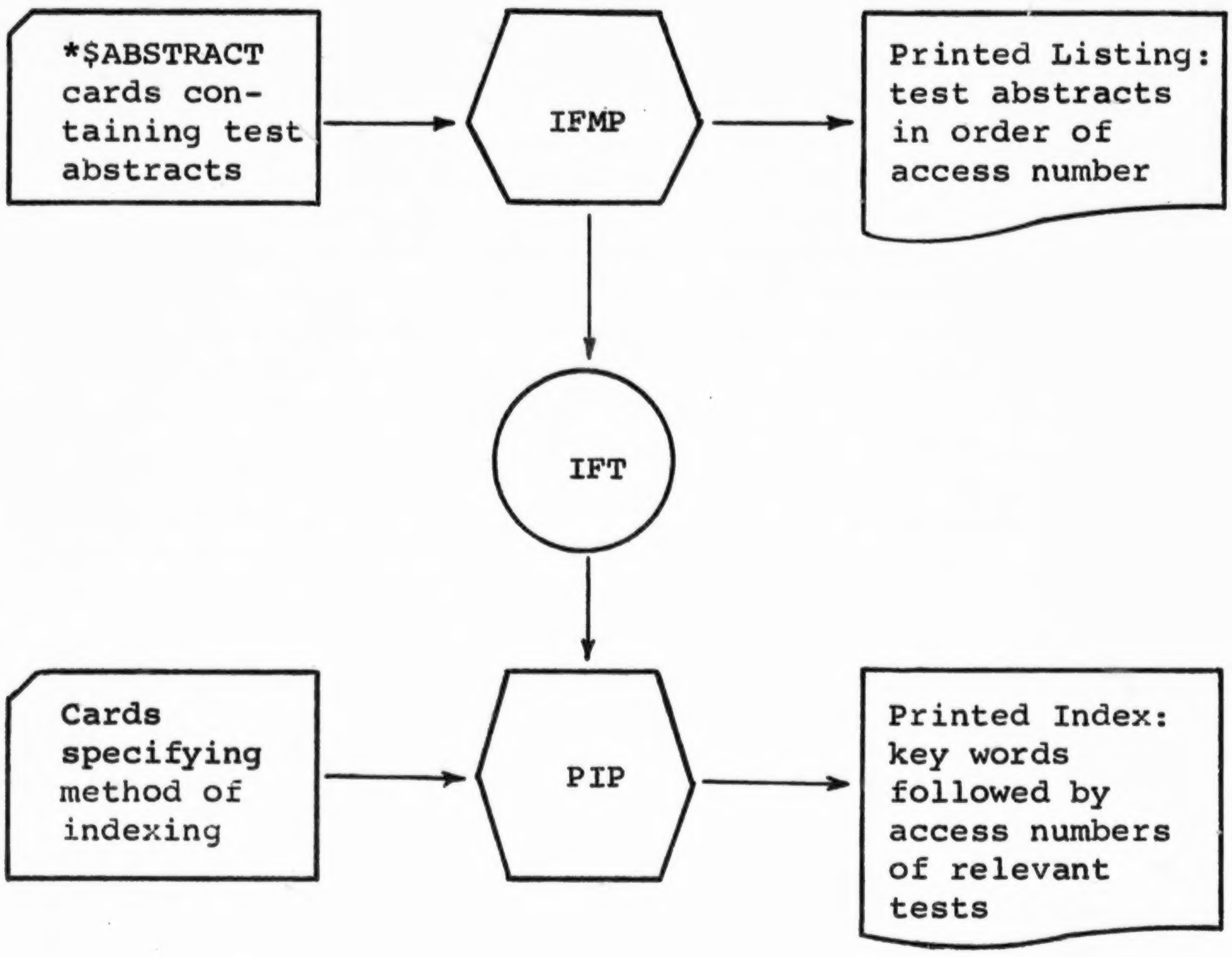
As shown in the figure, the first step is to store all of the abstracts on an Information File Tape (IFT) with the Information File Maintenance Program (IFMP). This program reads the abstracts from cards, assigns unique access numbers, and stores both access numbers and abstracts on the tape. In this application, the program is also used to generate a printed report containing the set of abstracts ordered by access number.

The second step is to use the Printed Indexing Program (PIP) to generate and print the key-word index. PIP reads control cards specifying the method of indexing and then uses the abstracts and access numbers on the IFT to generate the index, containing an alphabetized list of key-words. Each key-word is followed by the access numbers of the relevant test abstracts. The printed set of abstracts and the key-word index are combined to form the indexed book.

The automated reference service is essentially a question answering facility, permitting users of the test library to request abstracts for particular types of psychological tests. The procedures involved in developing and using such a service with BIRS/I are summarized in Figure 2 and Figure 3.

As shown in Figure 2, the first step in generating such an automated IR System is to store all of the abstracts on an IFT, by means of the IFMP. Next, each abstract must be indexed or described by means of a set of key descriptive terms punched on cards. An example of such cards is given in Table 4, above. The descriptor cards may be manually generated by the user, or automatically generated from the IFT by the Descriptive Analysis Program (DAP). In either case, these cards are used to prepare an index on a DFT, by means of the DFMP, as shown in the figure.

FIGURE 1: Generating an Indexed Book with BIRS


*$ABSTRACT cards containing test abstracts
IFMP
Printed Listing: test abstracts in order of access number
IFT
Cards specifying method of indexing
PIP
Printed Index: key words followed by access numbers of relevant tests

The procedure for operating an automated reference service is summarized in Figure 3. In the case of the test library, users submit questions to the system in the form of sets of key-terms describing the type of test of interest. These terms are punched on cards as illustrated in Table 4, above. The cards containing questions are read by the Description File Search Program (DFSP), which compares each question statement with all of the test descriptions previously stored on the DFT. Control options are provided in the DFSP to permit the selection of various methods of narrowing or broadening the search. Unless otherwise specified by the user, a similarity (or relevance) index is calculated on the basis of the number of matching terms between questions and descriptions, and the access numbers of a specified number of abstracts are selected by the program on the basis of this index of similarity. The question and access numbers for relevant abstracts are stored on the QFT, for retrieval from the IFT, by the Information File Retrieval Program (IFRP). This program prints a report for each question which includes the set of relevant abstracts, ordered by the index of relevance.

FIGURE 2: Generating an Automated Searching and Retrieval System with BIRS/I

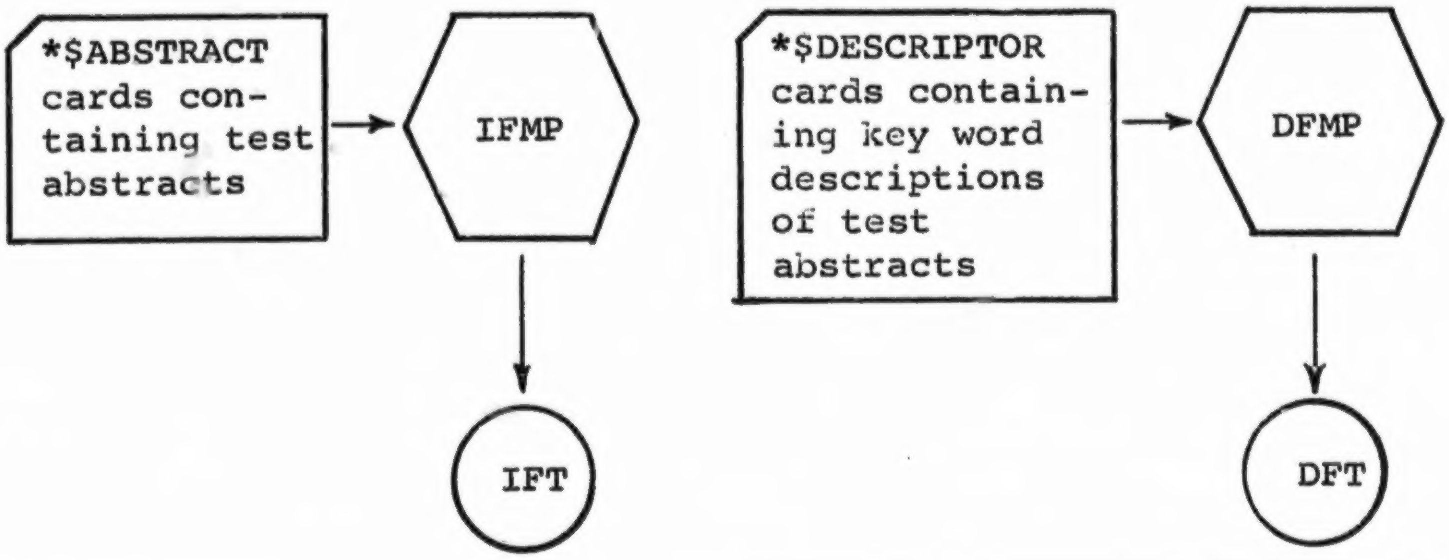
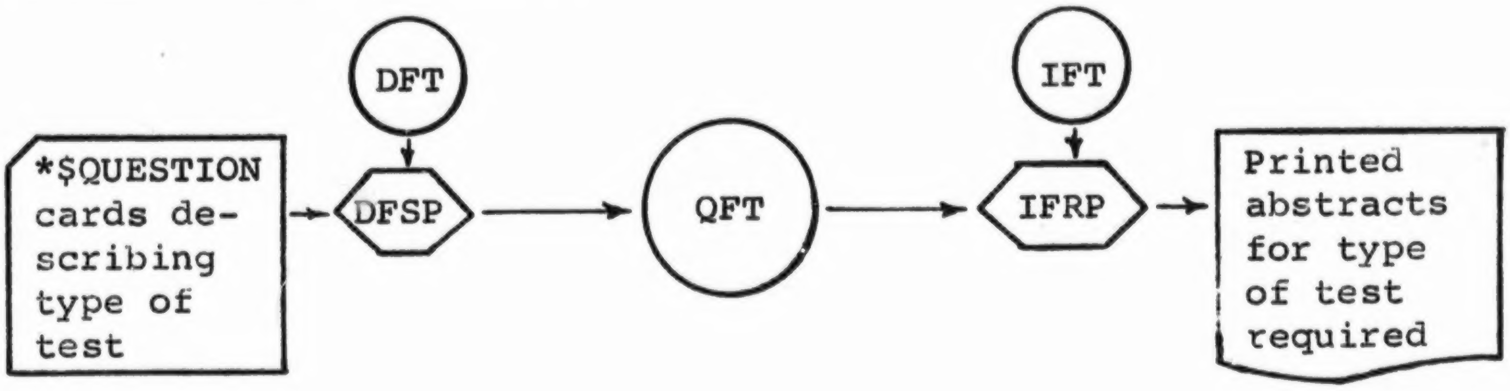

*$ABSTRACT cards containing test abstracts
IFMP
IFT
*$DESCRIPTOR cards containing key word descriptions of test abstracts
DFMP
DFT

FIGURE 3: Using an Automated Searching and Retrieval System with BIRS/I


*$QUESTION cards describing type of test
DFT
DFSP
QFT
IFT
IFRP
Printed abstracts for type of test required

CONCLUSIONS

In conception and design, the Basic Indexing and Retrieval System represents an attempt to help the average university scholar or scientist take an initial step beyond traditional library technology, toward the full utilization of computers in information retrieval. The initial version of the system includes many inadequacies. For example, BIRS/I does not include programs suitable for handling a thesaurus or dictionary of synonyms in the process of information indexing, as described by authors such as Bourne (1963), or for handling more complex descriptions of abstracts, such as Maron and Kuhns (1960) "weighted indexing." However, BIRS is designed to be easily modified and improved. In particular, a revised version of the system (BIRS/II) is now under preparation. Essentially, BIRS/II will be identical to BIRS/I except that the revised version will include several new component programs permitting (1) the use of a thesaurus of synonyms in information indexing, (2) the use of logical ("and," "or," "not") and algebraic ("equal to," "greater than," "less than") operators in stating questions for information retrieval, and (3) the use of relevance weights in both information indexing and retrieval, i.e., the use of key-terms with associated numerical weights to describe abstracts and formulate questions. In short, BIRS/II will provide programs capable of aiding with the development of any IR System, which does not make extensive use of the syntactic structure of natural language.

Obviously, BIRS/I and BIRS/II are merely preliminary steps toward the development of adequate collections of computer programs for information retrieval. Hopefully, other scholars and scientists will join us in using, improving, and eventually replacing BIRS with more adaptive systems of programs. At best, systems like BIRS will provide the foundations for a growing awareness in the academic community of the usefulness of computers in extending the contact of the individual researcher with the work of his colleagues.

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CHAPTER VII

INFORMATION STORAGE AND RETRIEVAL SYSTEMS

Dennis H. Jaroh

The ultimate goal of the educator might be to effectively organize his material for presentation to the student so that upon the first presentation of that material the student gains full cognition of the concepts or the idea. If this goal is to be realized, it is necessary for the educator to have sources of information and material so organized and the equipment effectively operable that when the moment of learning has approached for the student, the development of the conceptual factors do not lag behind the pace set in the mind of the learner.

To be specific in nature, we as educators need information effectively organized and well presented in some format for classroom utilization. Secondly, we need more effective ways of getting at the information. Even though producers of materials have tried to give informative and desirable annotations of their material, and have offered help in organization of the material into catalogs for individual teacher searching; this is inefficient and time consuming for the educator. Thirdly, we need effective and efficient equipment that is easily operable for that educator who feels that there are other effective methodologies, other than books, that can communicate the desired goals for learning. The successive delineations of these factors do not indicate a level of importance, they merely point to the need that must be satisfactorily answered prior to the economically feasible educational pattern that must be forthcoming if we insist on public education of the highest quality for the masses.

It is from this goal of an educator that I direct my remarks to you. Where could I find a good film on Southeast Asia, and specifically on the interaction of cultural groups for a fourth grade class in social studies and have the film last only 4½ minutes? Or as a producer of films, are there any films that have been produced with the specific purpose in mind that could meet the requirements imposed of interaction, cultural groups, fourth grade level, 4½ minutes in length and be of high quality? Can these requirements be met? These two questions, though simple, are the basis of the Single Concept Film Clip Project at Michigan State University under the direction of Dr. Charles Schuller and Dr. Elwood Miller.

Let us first consider the typical educational film as the teacher might strive to use it effectively. The general quality will be high but as usual some parts are of superior quality and yet other parts leave something to be desired. The film that is selected might be 12 minutes long and have excellent material scattered throughout the entire length of the film but with only seven minutes alloted for the actual showing, this quality film is passed over. Numerous individuals suffer from this serious problem, but most important, the student is gaining little or nothing from the time that was spent in searching for the film. This problem seems of little consequence with casual observation but when compounded with other inadequacies of communication the final result is an astronomical number of times that our antiquated systems of information handling has failed to meet the needs of the student that truly desires to learn. This specific problem of information handling leads us to the first of three considerations for this paper.

Information comes to the educator in the canned version of the film. If this canned version of information is to serve the purpose of communication, educators generally agree that effective utilization requires introduction and some form of follow-up. These activities require information about the film that is often inadequate from the annotation given in the catalog. In defense of the producers, it would be virtually impossible to include all of the pertinent information about films to allow adequate utilization. It is then necessary to find some form of information handling so that films can be sectioned into conceptual divisions.

In the film clip project it was our desire to delineate specific filmed areas that would explain a single concept or idea. For this purpose selected graduate students were asked to spend time looking at numerous films. This service was part of the project's budget, thus the quality of consideration given to each of the clipping operations could remain high. The initial clipping operations did not include the development of the treatment sheet and/or actual information that was to be part of the description. A short time later each of the clips were again viewed to determine the quality of material and adequacy of communication for a specific concept. The format of the treatment sheet was developed to include information about the parent film and producer, and the specifics of the clipped portion.

Each clip received an individual title, accession number, spool number, and description. For the purpose of information handling, it is inadequate to identify films by a single item unless this item is so distinctive it only identifies groups rather than the specific material. It was, therefore, necessary for each of the subject area specialists to make a selection of key words from their descriptive annotation of the excerpted portion of the film. These key words were then underlined and used as the basis of the developed thesaurus. In this initial phase of the project, the primary concern was development of the methodology that would allow for the retrieval of the specific film and then a grouping of films that could be adequately used to communicate single concepts. Up to this point the entire project was subjective in nature and the educators utilizing this thesaurus would be bound by the limitations of the excerpting phase and the selections of the key words. While these limitations are imparing the quality of the selection of the desired films, this method is superior to selection by mere annotation found in catalogs.

Desiring to improve the quality of decision making in film selection, it is imperative to reduce subjectivity and approach objective searching. At this point the decision was made to select some effective method of information storage that would consider the sum total of the area specialist's annotation. We went to the BIRS system that was in the developmental stage at Michigan State University under the direction of Dr. John Vinsonhaler. Through his interest in our problems of information storage and retrieval, he accepted the challenge of storing information of some 818 film clips selected from approximately 450 films of our selected subject library.

The library of information would be only as good as the information that would go into the storage unit of the computer. The task was clearly defined. Entire treatment sheet storage would give an objective form of information storage, but not all of the information is of pertinent nature for teacher utilization. Some decisions had to be made about the material that should make for effective classroom use. Thus, the selections were as follows: Documentation or abstract number with the title of the clip, film title with the producer, summary of the excerpted portion, subject area, level of use as determined by the area expert excerpting the concept, and utilization data of time, sound or silent, and color or black and white. It should be noted that the time was based on normal sound speed of 40 feet of film per minute. Each of the individual sheets were marked for deletions. All of the sheets were key punched on IBM cards at the Computer Center under the direction of Joan Dunn. Verification was mandatory, but finding the cost of machine verification running in excess of the initial printing time, we turned to visual verification.

With the verified cards in numerical order, we turned to Mr. John Hafterson the assistant to Dr. Vinsonhaler for further direction. The material was then placed in the IBM 3600 computer for initial storage on tapes. The first request was submitted to the computer in the form of the direction to print in order the complete listing of the information that should be found on the tapes. As expected, glaring errors appeared. Cards had to be pulled for the purpose of correcting misspellings, sentence fragmentations, and indexing numbers within individual card groups. Corrected cards were then placed on the tapes after the computer was directed to delete those cards containing the errors. The information is now stored in the three forms of treatment sheets, IBM key punched cards, and on the tape of the 3600.

Information must now be retrieved through some instruction given to the computer. Any series of questions would lead the computer to spend hours of time in searching through the total of the information stored. This is inefficient and expensive and at best could give random selection. The implementation of the BIRS system is necessary at this point. An index of key words in context would prove useful and improve the accession of information beyond random levels. A series of directions were fed into the computer along with the direction of overlooking certain words such as conjunctions, articles, prepositions, and pronouns. With the first 100 of the abstracts, the initial index was formed. This index consists of the indexed word and then the line of the contextual material in which the specific word appears and as part of that individual line the abstract number and the number of the card within the abstract. Upon inspection of the index and the impressive amounts of information that was printed, it was determined that further deletions would be necessary if the index would be complete enough and yet sufficiently brief for an economical demonstration of its use. Deletions and corrections made on the basis of the first 100 of the abstracts proved useful in the final indexing phase of the information.

Two hours and two minutes after the entire information file was fed into the computer a final index was produced. This specific index is approximately 800 computer pages long. On the basis of the first 100 abstracts without deletions, the original time and length of the final index would have exceeded this already long index by several hundred pages without any marked improvement in the final product. Though the cost of this initial index is above $800.00, this is much less than the cost of time to get a comparable index extracted from catalog annotations by producers and is of superior quality for utilization by educators. This index is in effect a thesaurus produced by machine and is applicable for hand searching techniques.

We are not really concerned with applicability of the index for manual searches, because we are at the threshold of the machine automated search for films of high relevance factors to the specific concept that can be best demonstrated through effective use of the film medium.

The next phase consists of building the descriptor file for the automated search program. This file is a specific linkage of words of the index to the abstract that represents the excerpted single concept film that has been stored on individual spools. Cards are prepared by the computer for the purpose of this file construction. Printed forms of this process could be obtained from the computer that would identify either a word and a series of abstract numbers for each of the places in the entire library where this term appears or the computer could identify the abstract number and list all of the indexed terms that appear within the contextual material originally submitted. This, then in very general terms represents the series of steps taken for the production of the bank of information for the retrieval of data about specific single concept film clips.

With the advent of this vast amount of information and the system of retrieval, I wish to direct your attention to the individuals that might find use for this in the educational setting of the classroom or learning laboratory. The responsibility for learning must be accepted by either the teacher or the student and the other individual has to accept the alternate roles offered in the formal school setting.

If it be the teacher that accepts this responsibility, plans are developed for the direction of the communication of descriptive information that clearly defines or refines the concepts that lead the student to learning or developing the general cognition of ideas. If the student accepts the responsibility for learning, he may arrive at cognition without some of the steps of the master teacher. In either case, there may be a time when the idea becomes functional in the behavior pattern only if the film medium is utilized efficiently and with immediacy. The traditional method of retrieval of relevant footage for specific subject material has been from the film catalog or from direction offered by others with experience.

Presently, we are testing the BIRS system through the use of questions derived from actual film requests. These requests for film footage have come to me in the form of the typical question. An example of such a question might be: What film is available on the source of moisture in the atmosphere. This type needs further refinement if the automated search is to be efficiently used. Specific information is needed to break the general idea into the components of either evaporation or condensation, or the combination of both physical phenomena, the possible desired grade level of usage, and possible length. This refinement might be handled by any individual familiar with the printed thesaurus derived from the indexing operations.

The single question or any series of questions are then fed to the 3600 computer with other information about the film selection. Other information might include the level of relevance that would be acceptable, the number of abstracts that should not be exceeded in the searching operations, and the method of reporting the findings. Thus, the programming of the computer has been organized for these operations and within short times (milliseconds of time) returns sheets of data about the various films of the library. If these films are used they may clearify meanings of questionable or unclear concepts. The major concern at this point is to so phrase the question to indicate to the computer the words for which films have been gathered in our library. The teacher, after receiving the information about the films that are available on this subject, has the opportunity of individual selection based upon the number of films allowed and the relevance factor programed into the specific operation. Upon the actual selection of the desired film, the physical storage of the film clips is the next location at which the teacher is found.

It should be noted at this point that only information is handled by the computer and not the storage or the physical manipulation of the films for showing. Even though programs could be devised for this purpose, it seems distant in the future that public schools systems or individual schools would have the capabilities for automated systems from the inception of the question or statement of need to the direct end product of showing of the film.

If the student takes the responsibility for his own learning through either self-designed programs or the learning laboratory, he has the opportunity of following the identical steps of totally manual searching in catalogs, the partially automated technique, or totally automated retrieval of information about the film library. In either case of student or teacher acceptance of the responsibility for learning, the latitude and depth of search is magnified due to the rapidity of computer retrieval of the pertinent information. Almost no time is lost in tedious catalog search of one producer and then on to the next producers annotations because of the centrality and coordinate system of indexing of the computer.

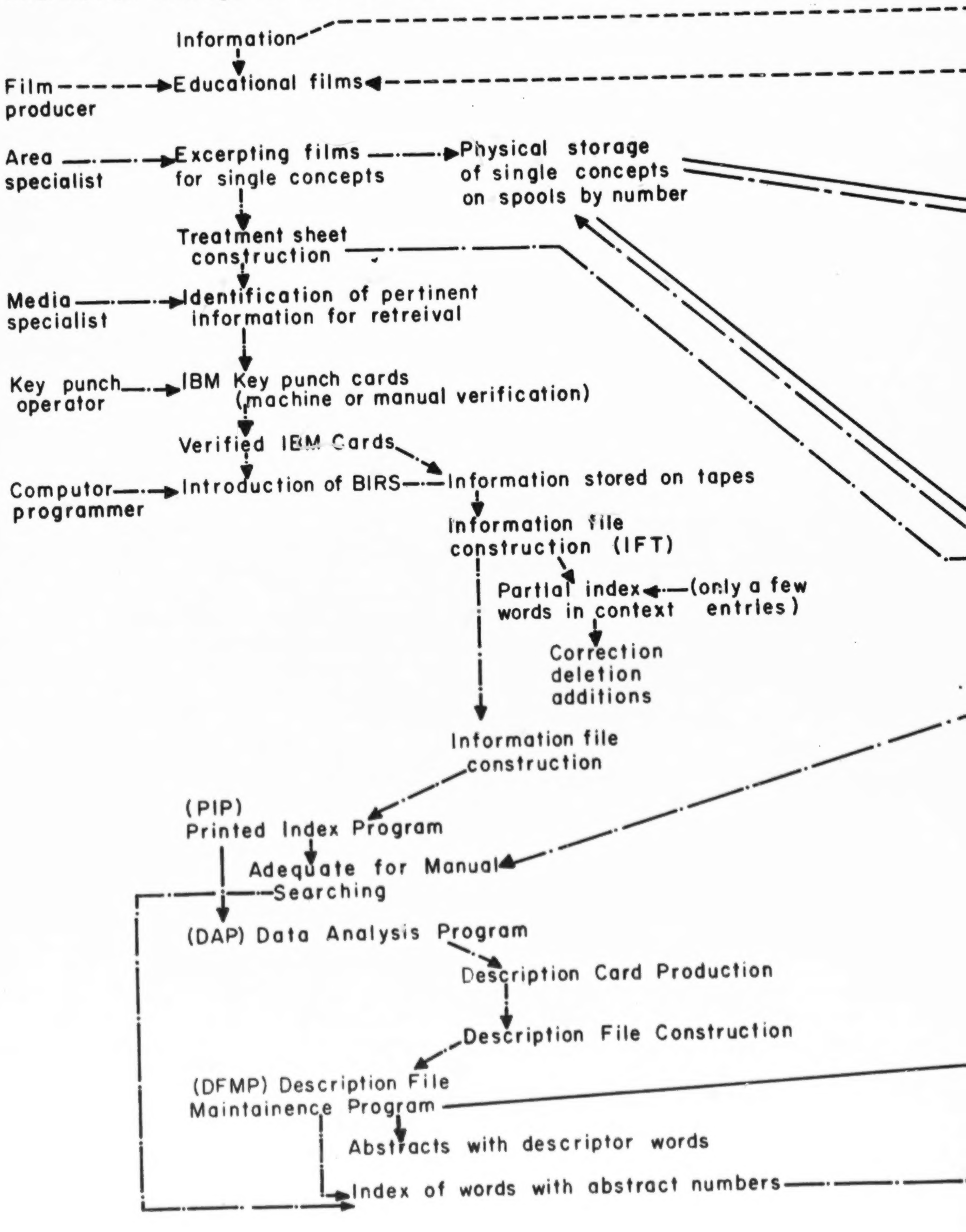
The uses to which this indexing system could be put are varied. When the appropriate moment of learning arrives, both the educator and the student would find valuable time saved and a wider range of filmed material for clearification of the individual concepts or general idea development.

But, to what other uses might this system serve? Producers of films are constantly searching the field to identify subject areas that have not been captured on film or those that need serious reconsideration in the film medium because of lack of information at the time of the original filming, or because of date, or any other of the multitude of reasons for film production. Even the equipment manufacturer may find valuable use of such a system for direct information. If others find that films are readily available, a state of emergency will arise for adequately operable equipment necessary for either individual viewing stations or classroom utilization.

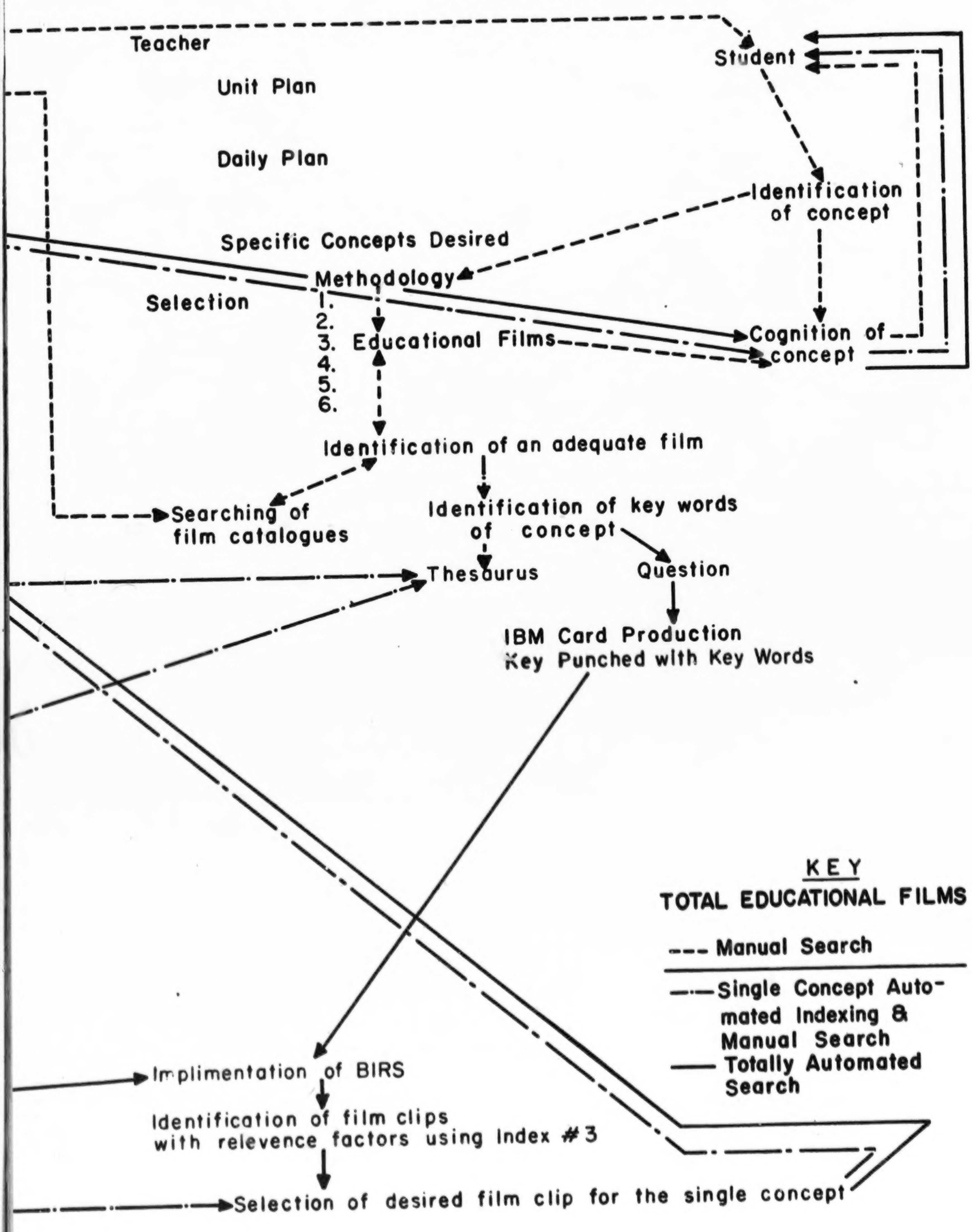
In summary, the computerized approach to film information depends on adequate storage and retrieval systems of information. The quality and quantity of information depends on the original source, whether it is done by academicians, or more practically, done by the producers of the original material. Verification of input is a requirement of all information on IBM key punch cards. The pattern of questions and key words used for searching the information file requires either the thesaurus produced or the knowledge of the questioner. The applicability of any one of the clips depends upon the film excerpted, the equipment used in viewing, and the quality of the presentation in which that clip is used.

The direction that has been given throughout this project is only one of the possible variations of the computerized approach to information storage and retrieval in the given form of treatment sheets. Should this project of information handling be dropped, and the ultimate goals of the educational system be readjusted to the traditional system of using total educational films regardless of the value they give to understanding of concepts? I would like to think that those assembled here have the courage to take this information storage direction, and the challenge of a unified approach to banks of information about the single concepts recorded in their films. The acceptance by the professional educator of both the single concept idea and the learning laboratory should point to the need for such information handling and spur producers interested in gaining a larger share of the media market to effectively form jointly organized sources of information comparable to this initial project.

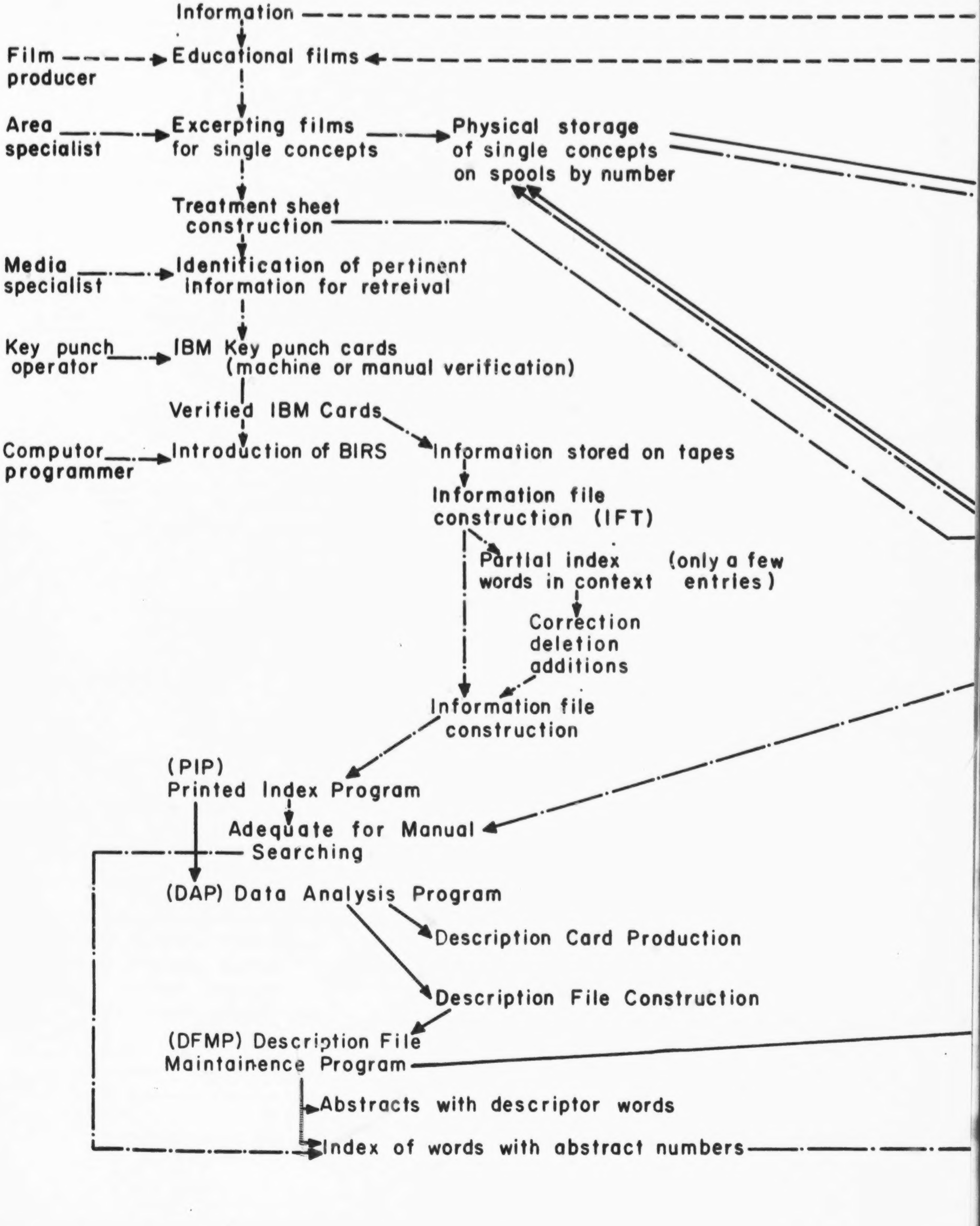
Information Storage for the SCFCP


Information
Film producer
Educational films
Area specialist
Excerpting films for single concepts
Physical storage of single concepts on spools by number
Treatment sheet construction
Media specialist
Identification of pertinent information for retreival
Key punch operator
IBM Key punch cards (machine or manual verification)
Verified IBM Cards
Computor programmer
Introduction of BIRS
Information stored on tapes
Information file construction (IFT)
Partial index words in context
(only a few entries)
Correction deletion additions
Information file construction
(PIP) Printed Index Program
Adequate for Manual Searching
(DAP) Data Analysis Program
Description Card Production
Description File Construction
(DFMP) Description File Maintainence Program
Abstracts with descriptor words
Index of words with abstract numbers

Student Responsible for Learning


Teacher
Student
Unit Plan
Daily Plan
Identification of concept
Specific Concepts Desired
Methodology
Selection
1.
2.
3. Educational Films
4.
5.
6.
Cognition of concept
Identification of an adequate film
Searching of film catalogues
Identification of key words of concept
Thesaurus
Question
IBM Card Production Key Punched with Key Words
KEY
TOTAL EDUCATIONAL FILMS
--- Manual Search
—·— Single Concept Automated Indexing & Manual Search
—— Totally Automated Search
Implimentation of BIRS
Identification of film clips with relevence factors using Index #3
Selection of desired film clip for the single concept

Information Storage for the SCFCP


Information
Film producer
Educational films
Area specialist
Excerpting films for single concepts
Physical storage of single concepts on spools by number
Treatment sheet construction
Media specialist
Identification of pertinent information for retreival
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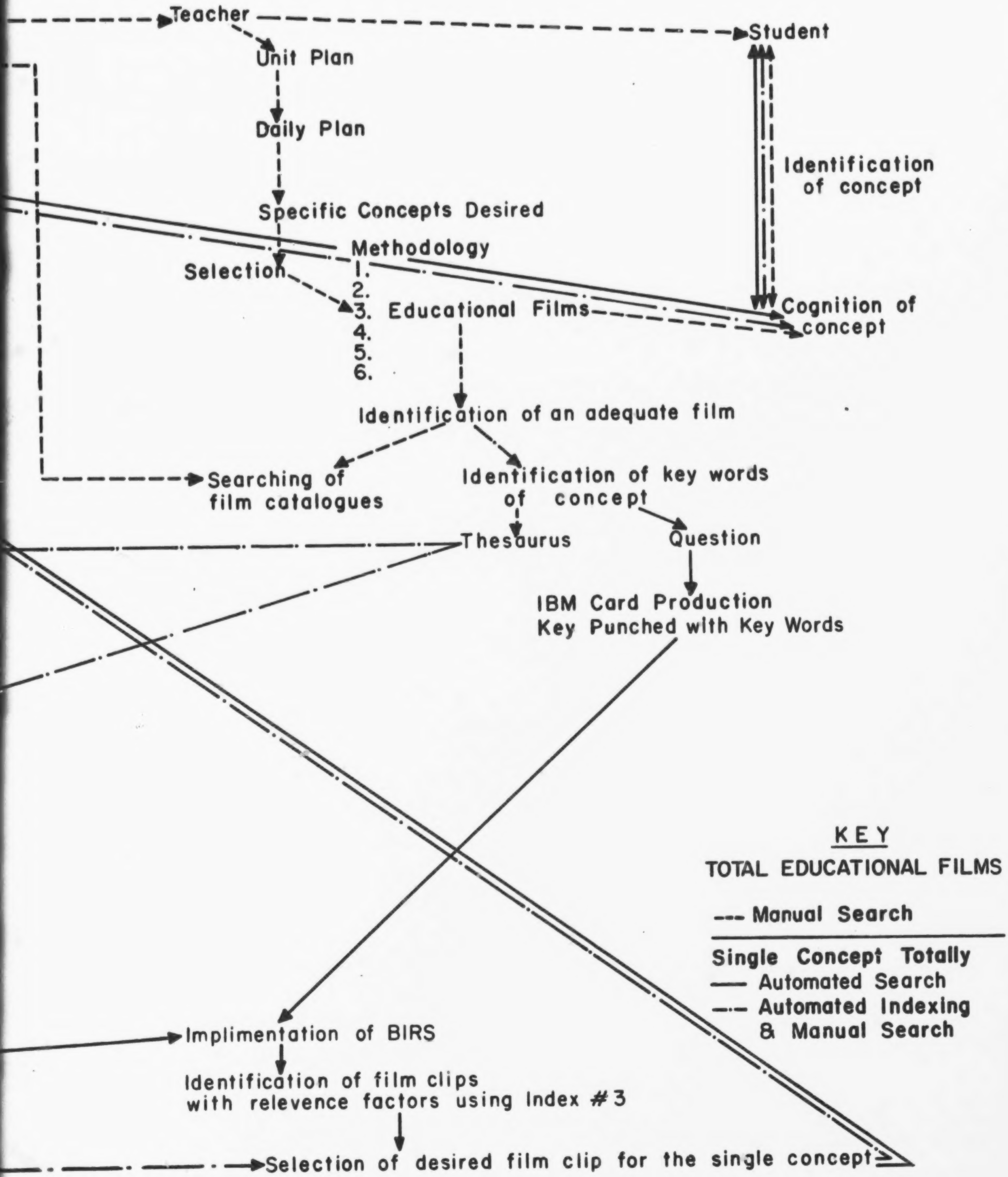
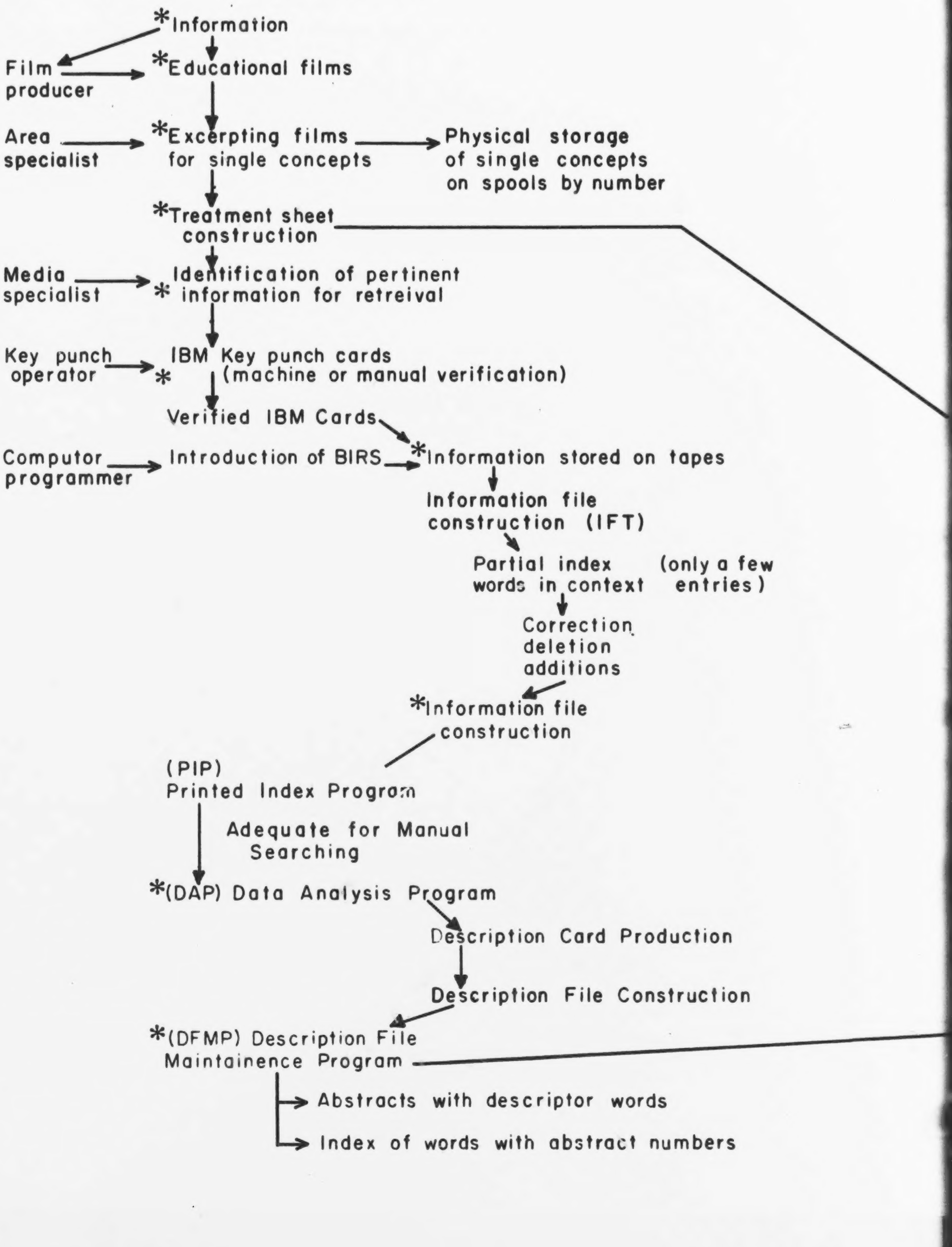
Adequate for Manual Searching
(DAP) Data Analysis Program
Description Card Production
Description File Construction
(DFMP) Description File Maintainence Program
Abstracts with descriptor words
Index of words with abstract numbers

Teacher Responsible for Learning


Teacher
Student
Unit Plan
Daily Plan
Identification of concept
Specific Concepts Desired
Methodology
Selection
1.
2.
3. Educational Films
4.
5.
6.
Cognition of concept
Identification of an adequate film
Searching of film catalogues
Identification of key words of concept
Thesaurus
Question
IBM Card Production Key Punched with Key Words
KEY
TOTAL EDUCATIONAL FILMS
--- Manual Search
Single Concept Totally
— Automated Search
-·- Automated Indexing & Manual Search
Implimentation of BIRS
Identification of film clips with relevence factors using Index #3
Selection of desired film clip for the single concept

Information Storage for the SCFCP


*Information
Film producer
*Educational films
Area specialist
*Excerpting films for single concepts
Physical storage of single concepts on spools by number
*Treatment sheet construction
Media specialist
* Identification of pertinent information for retreival
Key punch operator
* IBM Key punch cards (machine or manual verification)
Verified IBM Cards
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Adequate for Manual Searching
*(DAP) Data Analysis Program
Description Card Production
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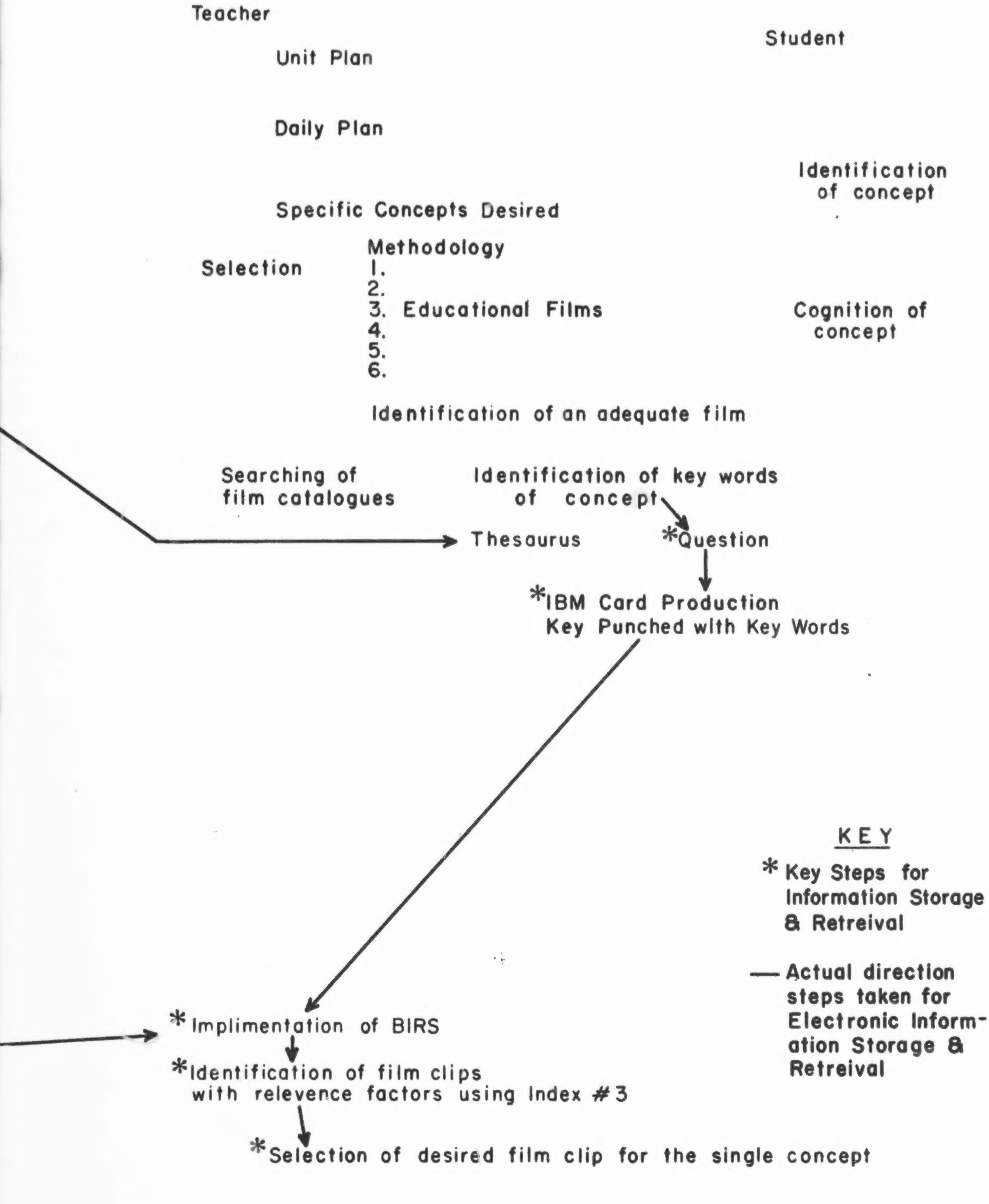
*(DFMP) Description File Maintainence Program
Abstracts with descriptor words
Index of words with abstract numbers

Computerized Information Storage & Retreival System flow chart


Teacher
Student
Unit Plan
Daily Plan
Identification of concept
Specific Concepts Desired
Methodology
Selection
1.
2.
3. Educational Films
4.
5.
6.
Cognition of concept
Identification of an adequate film
Searching of film catalogues
Identification of key words of concept
Thesaurus
*Question
*IBM Card Production Key Punched with Key Words
*Implimentation of BIRS
*Identification of film clips with relevence factors using Index #3
*Selection of desired film clip for the single concept
KEY
* Key Steps for Information Storage & Retreival
— Actual direction steps taken for Electronic Information Storage & Retreival

CHAPTER VIII

THE SHORT FILM IN AUDIOVISUAL RESEARCH

Thomas F. Baldwin

The prospect of what *students* might learn from short films is very interesting, or none of us would be here. Perhaps even more exciting, however, is what *we* might learn. That is, what producers of films and educators might learn about the communication process and learning in general, and specifically, audiovisual learning. I think that in no other audiovisual form, has the opportunity for *useful* research been greater.

Consider the unfortunate film researcher of a few years ago. His first necessity was to establish that learning from film was even possible, and later, that it was at least as efficient as other means of instruction. But this told him very little about how to design his film for maximum learning. Once the comparative studies had established the feasibility and relative efficiency of film, the researcher could turn his attention to the production variables within the film. For instance, various types of visuals, the pacing of the audio, the embellishment of the film for interest, and other kinds of film design variables were investigated in turn. The number of variables in instructional films--the number of ways to film and cut together any given subject matter--made this a slow process. The study of one variable at a time with "other things equal" drew the obvious criticism that other things are seldom equal or invariant. For systematic determination of effects due to production variables, the films were much too long, there were too many things happening, too many objectives were undertaken.

In designing films we have all of the different techniques, or arts, of visualizing objects, events and ideas. We have all of the different ways of putting words together to talk about them. Additionally, we have different degrees of *relationship* between the audio and visual elements. In almost all cases, the longer the film, the more these ways or techniques vary. What's more, in any given instructional film of extended length, we might expect to list several general objectives and any number of subordinate objectives. The prospectus for any single film may run the full taxonomy of educational objectives. This, of course, immensely complicates the determination of learning criteria and their measurement.

Even with multivariate analysis, one has difficulty in sorting out the variables, and in drawing conclusions.

The instructional television researcher has had a difficult a time. The common length of television lessons he wished to evaluate was 15 minutes to an hour. Often he was charged with the overall evaluation of an entire series of such programs. It is impossible to relate the various factors in program design to various learning criteria under these circumstances. Yet, to break the programs down into smaller units, brings the question of whether or not the result has any meaning for the whole.

On the other hand, in the short, "single concept" films, many of these problems are considerably reduced. By definition, I guess, the films are short. There is very likely to be only one objective for a film, and this of narrow scope. If the objective is stated operationally, or very specifically, the measurement problem is simplified--the appropriate criterion for "learning" is predetermined. Also, in the short film, the variety of visual materials and visual presentation techniques is limited. We do not usually find the full range of possibilities. I would suggest that, of necessity, there is a greater unity or consistency in the visual presentation form.

The same would hold for audio presentation, if indeed there is sound.

Yet, this more limited film form, is a meaningful unit in the educational process. At least we hope it is. This is not to say that a single short film may be studied apart from the instructional system in which it is placed. Ultimately it must be evaluated in relation to the system, but its unique contribution may be considered first, and it is this consideration that may provide us with some insights into the audiovisual learning process which have not heretofore been available. It may provide us with some principles for the design of instructional materials.

Because the short film is so limited in purpose and design, we pretty well know what its input to the system is. Knowing the input it then becomes easier to determine its effect.

I would like to describe briefly, some of my own research in "single concept" films as an illustration of some of the possibilities. To date, almost all of our materials have been drawn from Dr. Miller's vast library of short films here at Michigan State. All of these were originally of conventional length.

One such film was extracted from a Disney production entitled "Switzerland." The segment we used deals with the cheesemaking process in the Swiss Alps. With some adaptation on the cutting table and at the typewriter, we had a film with 10 visual elements, shots or scenes, and 10 audio elements, short sentences. Its duration was just over forty seconds.

Our resultant film was some what unreal in that the audio and visual elements were precisely matched so that shot one and sentence one were simultaneously opposed and of equal duration; the same was true of shot two and sentence two, etc.

I had some hypotheses, drawn from the Broadbent model of a single channel cognitive utilization system. The basic tenet of the model is that the cognitive system accepts the input from only one sensory channel at a time. This would seem to rule out simultaneous audio and visual communication, except that Broadbent has also demonstrated that there is a short term storage capacity within the system so that elements from one channel can be stored, very briefly, while elements from the other channel are being processed. I hypothesized, that if this were the case, a certain amount of redundancy would have to be present in the audiovisual message, if it were to be received in total.

I will not attempt to define redundancy, here, as I used it in the study. It was the sense of redundancy drawn from information theory and there are many times when I wished I had found or coined another term. Suffice it to say that I was attempting to measure the amount of compression possible in the audio and visual elements.

There were three measures of redundancy. One for the audio elements, another for the visual elements, and the one that turned out to be most important of all--redundancy in the relationship between the matched audio and visual elements. The latter was simply a measure of how well the audio and visual elements were related.

The film, or parts of the film, was presented to four groups of subjects who were all within the age group for which the film was intended.

The first group saw and heard the whole thing. They were then immediately asked to write down all of the audio and visual elements that they could remember. It was assumed that immediate recall might serve to index what entered the cognitive system and what did not. For each For each matched audio and visual unit, the number of subjects recalling both elements was recorded. These indices of recall were later to be related to the indices of redundancy.

The second group, being exposed only to the audio, provided us with an index of redundancy for the audio elements--an index number for each of the ten sentences.

The third group saw the visual elements, and provided an index of redundancy for each of the ten shots in the film.

The fourth, and final group was asked to match randomly sequenced audio and visual elements to indicate the degree of perceived relationship between the audio and visual elements that were actually matched in the original film.

The groups were all similar in age, intelligence, etc.

The indices of recall were then correlated with the indices of redundancy. As was predicted, there was a very strong degree of relationship between "redundancy" as measured, and recall. Most of the correlations were above a chance level, in spite of the fact that they had to be extremely high under the circumstances.

The best single predictor of recall, was the perceived relationship between audio and visual elements. If there were no perceptible relationship between the two elements, for instance--when the visual was just fill and while an audio point was being made--then there was very low recall of both elements. In fact, when the relationship between audio and visual elements was not clear, there was likely to be no recall of _either_ element; the whole audio-visual unit was lost, suggesting some sort of interference between the two which negated the entire message.

Since all three measures of redundancy contributed _independently_ to the prediction of recall, the prediction of recall by multiple correlation techniques was very high.

This research continues with other materials, and other measures of response. One project at present is to determine the most appropriate time for the introduction of the audio element. In one experiment, for instance, the audio element is not introduced until the visual element has been "established" for a few seconds. This will be compared to the same material where the audio and visual elements are being introduced simultaneously, which we have found, incidentally, is the most common case.

Hopefully, we will arrive at a set of principles for designing short films for maximum effect, although this is a long way off. Also, we had so much success predicting recall by using the instruments for measuring redundancy, that we are hopeful of adapting these to more general cases. They would then serve as quick pretests of short films. We might devise simple evaluation instruments to give an advance indication of the efficiency of a given film.

Finally, and ideally, we may ultimately be able to define "information" in terms that are appropriate for human communication, much like we are able to define "information" in mechanical systems. This will provide us with a much better means of assessing the cognitive capacities of students. We may learn how much information can be received at cognitive centers before the capacity of the system is exceeded and interference or loss occurs.

Much of this latter is wishful thinking, but it does have some value, I think, for long term goals. For the moment in film clip research, it is interesting and, I think, necessary to investigate the short term, or immediate opportunities, this form of audiovisual presentation has for improving instruction. There is the continuing responsibility to evaluate what we do and then build into each successive effort what we have learned from earlier work. In the single concept film we have much greater control of all the production variables that relate to the learning variables. We can break the message down into its fundamental elements, and analyze the relative contribution of these elements to our more limited objectives.

CHAPTER IX

A COMPARATIVE STUDY OF THE EFFECTIVENESS OF USING A FULL FILM AND SHORT FORMAT FILMS TO TEACH CHEMISTRY

Lloyd A. Trinklein

Introduction

As Dr. Miller told you this morning, one of the primary functions of the USOE Single Film Clip Project at Michigan State University during its first two years of operation was to determine if it was feasible to excerpt footage from existing educational films which could be used as single concept films. As is shown in the report of the Project, the members of this Project (of which I was a member for two years) consider that it is truly feasible.

Several of us on the Project became concerned about the fact that so many of these excerpts could be made available, but we didn't really know in what way they should be used. During the spring of 1965 Ardith Hanna and I did a pilot use study at Detroit Denby High School. Although this was not a carefully controlled study, the results were positive enough that we were convinced that further research on the use of excerpts as single concept films was warranted.

So in the summer of 1965, a study was designed which made use of excerpts from the CHEM Study series of films. All twenty-six of these films had been excerpted by our project, and we thought that these excerpts could be used in high school classes for teaching the concepts involved in the films.

Because of the need to produce a reliable and valid instrument for testing, it was decided to use the film BROMINE-ELEMENT FROM THE SEA, which is used near the end of the school year in the CHEM Study curriculum. The Project had excerpted five segments of footage from this film which were entitled: (1) Correct handling of bromine, (2) Reactivity of bromine and solubility of bromine compounds, (3) Preparation of aqueous bromine, (4) Laboratory extraction of bromine from sea water, and (5) Commercial extraction of bromine compared to the laboratory method. These excerpts included the major principles in the full film. The excerpts ranged in length from about 45 seconds to approximately 5 minutes. All of the filmed sequences used in the study were 16mm color and sound motion pictures and were projected in the classroom on standard 16mm sound projectors.

Design of the Experiment

The Population and Sample

The population which was used for the study was all of the schools within 125 miles of East Lansing, Michigan which had used the CHEM Study curriculum during the school year 1964-65. So presumably all of these schools had used the CHEM Study materials for at least one year. All of the schools fitting this description were contacted, and finally sixteen schools were selected to participate. Only one school had more than one teacher involved, the Henry Ford High School in Detroit. A total of 18 teachers used one of their classes as the experimental group. The final sample included 382 students of which 231 were boys and 151 were girls. Their ages ranged from 14 years 7 months to 18 years 2 months. On the Otis Quick-Scoring Mental Ability Test the students were along the entire IQ continuum from 64 to 135. These students came from many types of schools: Large and small, public and parochial, and included the total range of socio-economic status. So the sample was a rather typical group of high school students in Michigan.

The Criterion Measures

Two of the primary criteria for judging the validity of any study must be the reliability and validity of the instruments which are used as criterion measures. The tests which were constructed for this study were field-tested and revised twice in an attempt to produce a reliable instrument. The original test was produced for the first pilot use study at Detroit Denby High School. The answers on this test were item analyzed; and, on the basis of the item analysis, a first revision was written.

In December 1965 and January 1966 a second pilot study was conducted at Detroit Denby High School. The results of the use of the first revision of the test were again item analyzed, and a second revision was written. The second revision which was used in the major study contained seventy-five true or false items which were based on the subject matter content of the film excerpts. The result of these revisions was to increase the reliability from .65 on the first test to .70 for the post-test and .82 for the pre-test of the major study. These reliability coefficients compare favorable with many of the reliability coefficients listed for standardized tests. The validity of the test was established as content validity. The content which the instrument was designed to measure was concepts, descriptive material, and principles which were included in the film excerpts. Since the items of the test were based directly upon the list of all of the individual pieces of factual information with the excerpts, the test should be reasonably valid.

The Application of the Treatments

The first CHEM Study class of the day for each of the participating teachers was arbitrarily designated by the experimenter as the experimental class. Each teacher was unrestricted in his teaching of chapter nineteen of the CHEM Study text except for the addition of one of the three filmed treatments. These three treatments are: (1) Film only, (2) Excerpts only; and (3) A combination of the full film and the excerpts. To equalize the student exposure to the subject matter to be tested, each class saw the filmed portion of the treatment twice.

Three procedures were used to control the teacher variable. First, the subject matter in the film is not expressly taught elsewhere in the curriculum. Secondly, the experimenter wrote a summary for each film and each excerpt which were used by the teachers, and these summaries were the only introduction to the film or excerpt. Thirdly, a series of questions based upon the fundamental principles in the film and excerpts was used as the only basis of discussion of the filmed sequences.

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In the "film only" treatment, the teacher taught in his usual method until he came to the section of the chapter which the curriculum planner had assigned as the proper time for the showing of the full film. Then he read the introduction to the film and showed it to the class. Immediately following the viewing of the film, the content was discussed following the prescribed questions. After teaching the rest of the chapter, the teacher used the whole film as a review but without discussion.

In the "excerpts only" treatment, the teacher showed the excerpts twice. When the teacher reached a place in the chapter which had been arbitrarily assigned by the experimenter as a time for viewing one of the excerpts, he proceeded as follows: After reading the summary of the excerpt as an introduction, he showed the filmed sequence to the class. Next, he discussed the content following the prescribed questions. And finally, showed the single concept film again with no subsequent discussion.

In the combination treatment, the teacher followed the same procedure as the teacher using only the excerpts, except he did not show the excerpt the second time. Each of these teachers also showed the whole film as a review at the end of the chapter, but without discussion.

Analysis of the Data

The data which were analyzed by this study were collected in the following way:

Before beginning to teach chapter 19 of the CHEM Study text to which the experimental film applied, the teacher administered the Otis Quick-Scoring Mental Ability Test. This test was used to gain a general level of ability for each student. Also preceeding the chapter, a pre-test was given to each student. After the teacher had taught the chapter in his normal manner with the addition of the film treatment, he administered the objective post-test to each of his students. Thus, the data which were available for analysis to test the hypothesis were student scores on the Otis, the objective pre-test, and the objective post-test. The scores on the Otis test were changed to IQ's by using the conversion tables furnished by the publisher. The data which were actually analyzed were differences between each student's pre-test and post-test scores -- his achievement gain.

The null hypothesis which was tested by this experiment can be stated thus:

> There is no significant difference among the means of the achievement gains of three groups of students who have been taught factual information by means of a film, excerpts from the film, or a combination of a film and excerpts from the film.

Stated symbolically this hypothesis is:
$M_o : M_A = M_B = M_C$ The legend for these symbols is:

M_A = mean of film only treatment

M_B = mean of excerpts only treatment

M_C = mean of combination treatment

One way analysis of variance with unequal number of replications within the group was used first to test the null hypothesis. The independent variable used in this analysis was the treatment, and the dependent variables were IQ and the differences scores. The analysis of variance computed for difference scores and treatment showed an F statistic of 63.63972. Using the degrees of freedom between treatments as 2 and within treatments as 379, and F ratio of greater than 3.07 was necessary for significance at the .05 level of significances. This shows that there was significant difference among the means of the three treatments when the difference scores were analyzed with treatments alone. But an analysis of variance table was also computed for IQ's and treatment, which gave an F statistic of 29.60496. This statistic was also significant at the .05 level of significance. Therefore, there was also significant variance among the means of treatments on IQ also. Because of the significant variance among the treatments on IQ, the data were again analyzed; but this time analysis of covariance was used to control for IQ.

With 2 and 37B degrees of freedom, an F statistic of greater than 3.07 is required for rejection of the null hypothesis at the .05 level of significance. Thus with a computed F ratio of 63.893, the null hypothesis of no significant difference among the means of the three treatment groups can be rejected, and the alternative hypothesis can be accepted.

Because the null hypothesis was rejected, the Scheffe method of multiple comparisons can be used to determine if there is a directional relationship among the means. Using the method outlined in Guenther, a 95% confidence interval for each comparison was calculated. Using this confidence interval, significant variance was found between M_C and M_A, showing M_C to be significantly greater than M_A. Significant variance was also found between M_A and M_B. This significance by Scheffe comparisons allows the establishment of the following directional relationship:

$$M_C > M_A > M_B$$

or the adjusted mean of the combination treatment was significantly greater than the adjusted mean of the film treatment which was significantly greater than the adjusted mean of the excerpts treatment. Thus, it can be concluded that the achievement gain by the combination treatment was significantly greater than the achievement gain by either of the other treatments, and the achievement gain by the film treatment was significantly greater than the achievement gain by the excerpts treatment.

Conclusions

What conclusions can be drawn as a result of this study? At least one major conclusion can be drawn as a result of the present study:

> With CHEM Study chemistry students a combination of a full film and excerpts from that film produces greater achievement gain in the factual knowledge contained in the film than either the whole film or the excerpts alone.

By separating the film into meaningful segments and by using the whole film as a way of drawing together all of the individual ideas into a complete entity, significant learning took place. Although the adjusted mean of the achievement gain by the film only group was found significantly greater than the excerpts only group, the author does not feel that it is justified in concluding that it is better to use a whole film rather than excerpts from that film for the transmission of factual information. The major reason for this negative reaction to one of the findings of the study is due to the design of the experiment. In the "excerpts only" treatment, the students were shown the sequences throughout the teaching of the chapter. Thus, they had seen some of the excerpts almost a week before taking the post-test. In the "films only" treatment, the students saw the film as a review of the chapter only one day prior to taking the post-test. So the students in the film only treatment might retain more information because of the time factor alone.

Recommendations

Based upon the analysis of the data collected in this study, I would like to make the following recommendations: Although the single concept film treatment in this study was found to be the least desirable of the three treatments, significant learning did take place in the treatment which included the use of these filmed sequences. In addition, the students in the "film only" treatment, and those in the combination treatment responded on a questionnaire that they felt that many times the longer chemistry films contained too much information for them to absorb all of it. The students also responded that they thought the excerpts were easy to understand. Thus, if the subject matter had been broken down into smaller amounts in shorter films, perhaps the subject matter could have been more easily assimilated. Therefore, I recommend that single concept films be made available in greater quantities to teachers for use in their classrooms.

A second recommendation is specifically for producers of educational films. Since the major finding of this study is that greater achievement gain is possible through a combination of a long film and shorter films illustrating specific concepts or principles within the longer film and since the results of a questionnaire to the combination treatment students showed them to be overwhelmingly in favor of the combination over either the film or the excerpts alone, I recommend that the producers of educational films consider producing a package of films. This package should include single concept films to teach specific principles within a major area and a longer film which would serve as a means of summarizing the specific ideas within the shorter films. This idea of preparing film packages has already been done by Eothen Films. They have prepared several film packages for use in the public schools of England and in specialized schools such as nursing schools. Now that convenient methods of handling short, cartridged films are available, these "film coordinates" are a reasonable possibility.

A further recommendation also concerns the use of single concept films. Until the present, almost all programing was done by some form of verbalization. Since the technology is now available for convenient handling of single concept films, short filmed sequences could be utilized in many ways in programed instruction. When motion is required to present an idea in its correct perspective, a motion picture film should be utilized. Modern technology would provide the machines if some innovator presented the idea.

I would also like to make the following suggestions for further study:

1. A replication or replications of the present study should be done in another subject matter area and at different grade levels.

2. A study should be conducted to determine the effectiveness of other uses of whole film--short film combinations for purposes other than the transmission of factual information.

3. A determination of the most effective placement of the whole film in the combination should be carried out.

4. A study of retention should be done.

5. A comparison study of the individual use with classroom use of the short films in the combination would also be very profitable.

THE DISCUSSION QUESTIONS

In order to facilitate rapid and intensive discussion during the last two days of the National Conference, the following questions were prepared by the planning committee as a stragedy to trigger immediate discussion. The three sub groups were encouraged to use these questions as a "point of departure" but not restricted to those questions on the prepared list. Each of the three groups received a differing set of questions, selected from the matrix of questions that are reflected in the next several pages.

CHAPTER X

MICHIGAN STATE UNIVERSITY
INSTRUCTIONAL MEDIA CENTER

SINGLE CONCEPT FILM CLIP PROJECT
NATIONAL CONFERENCE ON CARTRIDGED FILMS

QUESTION SET ONE

"General questions needing a
position of perception"

8mm New Medium?

1. From the point of view of industry, and of education.....is the 8mm film, and, more particularly the cartridged film, seen as developing into a replacement of present 16mm film systems? Or is 8mm really a different medium from 16mm? If the latter, what generalizations can be made about the use of an 8mm system?

Interdependence Question

2. There is an interdependence between the software and the hardware. Education has a vested interest in both. Who takes the lead in determining standards? Can standards she developed that will satisfy all of the interest groups?

Markets

3. At least three possible marketing outlets can be identified. The categories might include the school market, the home market and the student bookshop market. Which is likely to have the most influence on films in terms of format, content and treatment standards? Which of the three is most likely to be the major market in the short-range? What about the long-range?

Market Survey

4. Is enough information available at this point in time to establish marketing surveys in order to predict with any degree of accuracy what is in the future for the cartridged film field?

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Information

5. A central repository of data about cartridged films would be of untold value to users of such materials. Is it reasonable to anticipate that software producers will cooperate in developing a comprehensive cataloging and information system such as the one described at this meeting? What steps could be taken at this conference to initiate planning for such an information system?

Electronics

6. Electronic systems of storing and displaying information similar to that now held in large part on motion picture film are already available. Each passing year increases the sophistication and lowers the cost of managing such information on tapes or discs. Should such electronic systems be a part of the planning in both the production of filmed material as well as in its display at the point of use?

Research

7. The Wagner paper indicates that modular films (in a sense cartridged films) can be a tool for increasingly sophisticated research in learning and teaching. What is the best method to rapidly organize such research? It is of prime concern to educators, but is it any less important to the commercial interests?

Educators Role

8. Recent trends in the instructional materials field in general seem to indicate that educators and commercial interests must work more and more closely in the development of curricular materials, particularly in the realm of communicating ideas and information. Where is the place of the scholar in this configuration? Also, what is the proper place of the teacher who is mostly concerned with effectively using such

systems of materials? In short, what is the role of the educator in the "grand design" of such instructional programs?

MICHIGAN STATE UNIVERSITY
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SINGLE CONCEPT FILM CLIP PROJECT
NATIONAL CONFERENCE ON CARTRIDGED FILMS

QUESTION SET TWO

A series of necessary decisions or "points of compromise" which may lead...

At some point, system designers must make a series of decisions that are results of compromise and organizational necessity. And so we arrive at The Conference "Nitty-Gritty."

Basic Mechanics

1. Listed below are some of the points identified by the conference planners as needing direct discussion by the conferees. Although they are stated in elliptical form, we believe they capture the issues involved.

   A. Format of film size, that is 8mm, Super 8mm or Mauer 8mm or others, such as the Panacolor system.
   B. Sound-silent, and the place of either or both.
   C. Optical-magnetic sound.
   D. Cartridge compatibility, between hardware. (i.e. Tape cartridges in autos.)
   E. Interchangeability of film between cartridges.
   F. Film speed, 16, 18, 24 frames per second.
   G. Picture-sound separation pattern.
   H. Standards in graphics and print size for production of such materials.
   I. Release print quality.

Compromise Questions

2. Writers often identify the "concept of compromise" as the genius of the American

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Social system. Compromise is possible in some of the problem areas of standardization. Here are two hypothetical examples!

A. A rational, short-range plan over a period of years might be developed in the transition from standard 8mm to Super 8mm film as the basic format. (Other systems could be inserted in place of the 8-Super 8.) Thus, on given dates, producers of hardware and software would make the shift or transition to a newer or differing system. The game of commercial "one upsmanship" would be tabled for this period of time.

B. A plan might be developed in which certain areas of instructional materials (or areas of film utilization) would use 8mm as their basic medium, while others would use Super 8mm as their medium. For example, a ground rule might be established that Super 8mm be used for front projection while standard 8mm film would be used for small, rear-screen projection.

Despite the obvious flaws in the above two cases, is such a "compromise plan" a practical way of resolving some of our problems?

New Name

3. Does this group see any need for a new name for the "single concept" film? Is a precise, operational definition necessary (or even possible) for such films? Could this group suggest a better name and agree upon a satisfactory definition?

Copyright

4. Problems of copyright and ownership haunt the film producer who is interested in excerpting existing filmed materials. Of equal interest is the concern for the "author" in the case of the modular use of materials,

as illustrated in the Wagner paper. What suggestions might this group make in terms of solving this important problem?

MICHIGAN STATE UNIVERSITY
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SINGLE CONCEPT FILM CLIP PROJECT
NATIONAL CONFERENCE ON CARTRIDGED FILMS

QUESTION SET THREE

...for more effective film use in classroom instruction--as well as provide an element for new innovative instructional systems.

Teacher Education

1. Proper and effective use of any instructional medium requires teacher education (or re-education). An analysis needs to be made of the discrepancy between what teachers know now and what they need to know in order to use such materials effectively. Then a method of attacking this discrepancy must be designed.

   Does a mutual or joint interest on the part of the educational group and the business interests exist? What type of a joint support plan might be initiated to solve the "effective" use problem?

Use Parameter

2. Should any attempt be made to set "use" parameters on 8mm or single concept films? ("Use" considered in terms of instructional content and in terms of learner grouping.) Would such information be of advantage to the producers of materials and hardware?

Budgets

3. Budgets can be planned more precisely if purchasers know the approximate life of films and equipment. Is it logical to expect industry to provide the user with base information on the life expectancy of equipment and filmed material?

TV Use

4. The Project staff feels that single concept cartridged films are superbly suited

for use in television programing for instructional purposes. Can equipment standards be established for such a use of cartridged films? (Much as the radio announcer selects and "plugs in" his commercial or public service announcement.)

Pricing

5. The Bailey paper opens a door on the question of pricing policies on marketed films. The policies of the producers of films seem to have always adhered to a "rule of thumb" that dictates the price of the film as primarily determined by the number of screen minutes. No print cost nor production price seems to enter into the pricing plan. In the market place, consumers see very little difference in film prices. Mr. Bailey seems to ask if the educational community will "stand still" for pricing policies that directly reflect the original production figure, as well as the print costs, of the film. Educators who buy films have much the same question, asked in terms of why all films seem to cost the same amount. Is the place to break this habit to the mutual advantage of both film producers and educators in the virtually new cartridged film area?

Tie-In

6. Is it possible to establish some criteria or ground rules for the so-called "tie-in" sale? Packages of hardware and software make a great deal of sense in one context, but in another they seem to raise serious limitations. Is such a marketing technique necessary or desirable?

THE SUMMARY REPORTS

Three men of national stature, prominent in the instructional media and audiovisual field, graciously consented to act as chairmen of the three subgroups. The real conference dialog took place within these three groups. Dr. Gabriel Ofiesh of The Catholic University, Dr. Paul Witt of Teachers College, Columbia University, and Dr. James Brown of San Jose State University were the three men that added so greatly to the dimensions of the conference. Their reports on the three discussion groups follow in the next section of the report on the National Conference.

CHAPTER XI

Dr. Gabriel Ofiesh

Our primary concern was not the promotion of any hardware-software system, rather it was to make it possible for students to learn. We felt that we've been relegating the student to the lowest priority in our concern and have shown unusually great concern with teachers teaching through readily accessable messages through the medium of motion pictures, rather than students learning.

The reason we just used the term messages is because some of us were confused about what "software" is. Apparently, to many media people, software is hardware that you can bend. To many others in the field of educational technology and to some key people in the USOE, Dr. Bright for example, software is the message, the stimuli configurations, the illustrations, the graphics, the audio itself, the sound waves, what is being said, what is being communicated. I think this is in the area that needs some clarification in the profession. In this conference, we have used "software" as something you can bend and "message" referring to frame content, etc.

The basic view that emerged from the latter part of the discussion, was that cartridge modular oriented films creates new kinds of learning experiences for students and new relations between films and those students and teacher relationships.

What is it that is unique about the cartridge? Let's talk about it in terms of learning it produces rather than in terms of any particular physical feature. In this respect, therefore, the most unique aspect of a cartridge which makes this possible is accessibility. Because of its accessibility, we have, therefore, increased the availability of many new kinds of experiences for any individual, small groups, and large groups. We have an increase in flexibility and options available to the messages designer. We feel that the message designer in discrete, modular areas can exercise a set of design option which he didn't have available before. Along with this, we have an increase in methodology options available to teachers.

A teacher could now turn to a modular system in a very difficult to teach area, request that it be produced or at least have it available on the shelf knowing that her difficult students may be helped didactically by this particular modular. So the area of methodology options available to teach, the area of options available to the student, the area of options available to the message designer are all increased because of the cartridge dimension.

Another unique feature of the cartridge is the potential motivational value it has due to its limited time span. We felt that even to students, especially a preschooler, or the elementary school child, there is a motivational value in just handling the cartridge itself. The repetitiveness, ease of operation, ease of logistics, modular aspects of the material, flexibility of message design, precision in utilization in terms of design intent, a facility for getting operational field test data that we would not get originally, are providing these and possibly other characteristics a means for collecting massive amounts of empirical and discrete data for further learning research and useful learning management experience.

The concern with standardization was a constant issue throughout the Conference. There are no fast and concise answers. Nor did we feel there ought to be. Currently, available cartridge film materials can provide valuable services to education. Standardization, though of valid importance in some circumstances, should not be used as an excuse for delaying utilization of this important and new concept. Therefore, we recommend that educators should evaluate existing hardware and software in the light of specific requirements in their own institution, and should then proceed with utilization, selecting the cartridge system most appropriate for each individual application.

On the other hand, we also felt it was incumbent on producers to furnish as complete information as possible on these elements which relate to each of these mechanics. Information should be made available as to whether a cartridge was suitable for a variety of devices, and what could be done with the materials in it. We felt this is more important than standardization. More often, utilization is hindered because of lack of information--not lack of standardization.

The Conference strongly recommends that ongoing national organizations representing vitally interested sections of this field, including such groups as those mentioned, should commence.

joint discussions. We would hope that such discussions would lead to the establishment of an effective, coordinated, and continuing voice representing the combined influences of their memberships and seek to stimulate increased utilization, expanded research, and encourage the creation of new and valid cartridge film programs, and, hopefully, promote a degree of what I would like to call "psychic-standardization" in this field. That is standardization through understanding. We feel this should be a priority item emerging from the recommendations of the Conference.

This also brought us into the area of the effectiveness of learning materials and here I may be treading on tender ground with respect to whether I am representing the consensus of the group or not. The instructional effectiveness of cartridge films is an equally appropriate consideration of all media and film materials. It is likely, however, that the requirements for effectiveness measures and criteria will first be focused on the cartridged film because it can be more easily handled and effectiveness data more readily acquired. This issue cannot be resolved in our discussion group, nor do I anticipate that it will be resolved in this Conference. It is recommended, however, that the matter of an evaluated criteria of learning effectiveness of media be the subject of a national conference sponsored by the USOE.

Unless the professional people involved in the area of auditing the effectiveness of materials do not do this, then other agencies will do it for them. Therefore, I personally urge that this be a matter of internal auditing and concern. If you don't report on the effectiveness of your materials, I think other people will report on the effectiveness of those materials. Therefore, I think that this data is an absolute necessity in an area of growth and development.

I think the cartridge film itself is something that lends itself to precise measurement, effectiveness, and validation and, therefore, we must look through it in order to open the whole area of effectiveness of our learning materials. I do think that this is something that cannot be resolved here, but I think it is something that is a matter of urgency, nationally, and something that may lead to another conference.

School and producer relations: Schoolmen must give the equipment manufacturers a valid design list of particulars. The schools' needs and promises should be determined and discharged to industry. Hopefully, an instrumentation will emerge that reflects the teaching aspirations of the curriculum people. Cooperative studies of school needs can permit industries to respond to the problems. Knowledgeable schoolmen must be expected to design a fluid, flexible and artistically viable medium. Leadership and initiative rightfully must start with the educators. Their design must also be carefully crafted and field tested to achieve the best instrumentation design. I think the consensus of the discussion group at this point was that the educators must state explicitly for a change what they want from the producers rather than expect the producers to anticipate what the educators would like to have. Until the educators do this, we don't think there will be any convergence.

Finally, I think getting back to Paul Witt's discussion group with respect to communication, we are concerned about the lack of a national-focal point for the dissemination of guidelines and information regarding developments in new media such as the cartridge modular film. It is known and there are concerns in the USOE in the following related areas: (1) Rapid developments in new junior colleges (one going up every week) and this possibly increasing one to two every three weeks in the next few years. (2) Educational learning resource materials centers which are going to be geared with providing materials for individualized self-instruction. (3) Dial access systems, audiovisual information retrieval dial access systems. (4) Trends from group and lockstep learning to individualized learning. (5) Trends from memory to inquiry, discovery and conceptually oriented learning. (6) New means of audiovisual transmition of information to human receivers which are presently hidden in the laboratories of hardware manufacturers.

The USOE is at this point concerned with developing guidelines for potential users, for designers of new educational facilities, and teachers and so forth. On the other hand, it's almost a schizophrenic type of operation because there is no relationship apparently between these concerns and the concerns in the USOE. If the present schism continues between these concerns, the role of significance of findings of this Conference in relation to these trends will be limited.

We should fully explore the significance of the 8mm cartridge against these developments, and we should insist that the USOE allow this to happen. We are concerned at the present, the USOE, although interested in developing guidelines for users in the various media of educational facilities, has at present no central mechanism for dissemination of findings of these conferences, or of material to support guidelines. The USOE has no mechanism for effective dissemination of the findings of other related conferences.

This Conference was a necessary, but not sufficient condition. Follow through is necessary. We have to realize that if there is no follow through to these deliberations, in the USOE, and through a dissemination mechanism that should be established, then that this was really just another fine Conference. Therefore, we would like to recommend that this matter should be brought to the attention of the Commissioner, and not only with respect to the cartridge but to respect to all media, and probably bring it to the attention of the National Advisory Committee on new educational media which was established by act of Congress to advise the Commissioner of Education on developments and legislation with respect to new media.

I think that I was personally (as a new member of this group) quite stimulated by the dedication and the quality of its concern that I have apparently noted here, not only the part of the educators, but especially on the part of the producers in trying to work with the educators to meet the problems and the concerns which emerged with our discussion group. We should all keep constantly in mind that our ultimate target really is not the teacher but it is the student.

CHAPTER XII

Dr. Paul Witt

Mr. Offenhauser described the procedures of the American Standards Association for establishing technical standards of the kind about which we are concerned. He will give Woodie Miller the references which describe these procedures.

We talked about the possibility of involving the Bureau of Standards in the establishment of standards for the 8mm field. We discussed the possible potential role of the Educational Products Information Exchange in the setting of standards for this field. We also discussed the influence of the Federal Government in influencing matters such as standards, due to its control of Federal funds that are being made available through the U.S. Office of Education for the purchase of equipment and materials. One member of our group very wisely warned us against dangers of establishing standards too early. Someone described this danger as "rigidizing" standards today and, thereby, handicapping the development of the medium and its equipment tomorrow.

There was a fairly general consensus that standards will be determined in the market place. As one member of our group said, "What school people will buy will set the standards." We were also reminded of Lou Forsdale's comment yesterday that if film and projectors are not used, standards are of little importance, and that if they are used, and used extensively, they will wear out and then we will be able to replace them with new models.

We noted that there is a real need for different kinds of equipment or different models of equipment for different uses. We disposed of the "sound-silent" question very quickly. We agreed that both sound and silent film are needed. It was our view that present production methods as well as the importance of excerpting sections of existing films will determine the answers to questions regarding film speed and the distance between picture and sound. It was also our view that present production methods permit us to go either to optical or to magnetic sound in duplicate prints.

We felt that the questions regarding cartridge compatibility and the interchangeability of film between cartridges are of greatest importance. We were agreed that it is urgent to achieve cartridge compatibility and the interchangeability of film between cartridges. We believe we should be able to perform these operations in workshops.

We gave only brief attention to the questions regarding 8mm, Super 8 or Maurer 8. Once again, we concluded that these questions will be answered in the market place. We did not discuss the matter of the quality of release prints. If we had, I suppose we might again have decided that the buyer will be the one who decided.

Software is crucial. It is the program that counts! We need films that will enable pupils to learn.

It was suggested in our group that we need to study convential film forms in order to discover useful adaptations of these forms as well as other creative ways for utilizing the moving image in the new hardware to achieve more effective and more efficient teaching and learning. We need more imaginative research and experimentation in the design of software. We need to explore variations in film length, modular designs for sets of films, etc.

Several members of our group stressed the importance of flexibility in film utilization. Films must be useful in a variety of situations. As a matter of fact, it is now true that films are often used extensively outside of the areas for which they were designed despite the fact that producers exercise great care in specifying the areas for which they are designed.

Another illustration of uses not anticipated by producers was reported by one of our commercial members who told us that foreign countries have purchased large quantities of silent 8mm film after they discovered they can easily adapt these films for use in situations where English is not the language of instruction.

A related tangential statement made in our discussion which I think is very important, was that it is quite prevalent today in school systems for the concern for a multiethnic approach in education to be a very influential factor in the evaluation and selection of film as well as other kinds of instructional materials. While some of us may not be so senitive to this factor and while it is not really the basic consideration in evaluating and selecting materials, present social conditions make this concern almost a final overriding criterion.

ROLE OF THE EDUCATOR IN DEVELOPMENT OF CURRICULUM MATERIALS

In our discussion of the educator's role in the development of curriculum materials, we were concerned particularly about this role with reference to the emerging instructional systems. We did not define the educator's role in materials development in precise terms. Nonetheless, I think the report of one of the producers in our group as to current practices in the utilization of educational personnel in materials production, made it clear that there are places for the media specialist, the subject matter specialist and the classroom teacher in this process. However, one of the commercial representatives pointed out that the producers are going to make the final decision because they are the ones who invest their money. On the other hand, he noted further that the producers have great difficulty making decisions regarding materials because of the plurality of pedagogical views among those of us in the profession. One report regarding the use of educators in materials production which I found very interesting, indicated that it is the practice of a certain producer to employ a traditionalist and a progressist and to have them work together on production problems. In the end, however, the producer decides whose advice he is going to follow. He apparently finds it valuable to have contrasting points of view.

It was also reported to us that many producers are now utilizing the recommendations of the major curriculum study groups in designing and producing materials. Several of the professional educators associated with these curriculum groups are also serving as consultants and advisors to producers. In my view, these developments indicate that the commerical producers play a highly significant role in facilitating modern curriculum developments.

Communication difficulties within the profession occupied our attention for a time. We agreed that this is a very serious problem. Due to poor communication, educators in large numbers, leaders as well as the rank and file, are often unaware of advances in methodology. They are equally unaware of the existence of many new materials. It's imperative that we continue to work on this problem. It is vital that we get information about materials and methods to administrators and supervisors. It is equally urgent that we get it to classroom teachers, as well.

We talked about the efforts of the traditional journals to do this job and recognized that they aren't succeeding completely. It was suggested that we may need new approaches. Specifically, it was suggested that we try the "Life" magazine format. It was pointed out that the new USOE magazine, "American Education," is attempting to do this.

We also noted that the USOE is not facilitating the communication of the research findings and the outcomes of other governmentally sponsored and supported educational enterprizes.

We were agreed that there is a need for an orderly, workable, national information system. Somebody asked, "Do we need to revive AVCOPI?" We talked about the Educational Media Index, the DAVI task force which is at work on this problem, and ERIC which is now being developed. Someone reported that in Ohio the medical doctors are being kept abreast of developments in their field by means of a special radio network. Some doctors participate in professional in-service education via their car radios as they drive from call to call. It was suggested in our group that we could make greater and more effective use of the amplified telephone in sharing resource people throughout the country. One member of our group proposed the possibility of this group passing a resolution on the communication problem.

The education of teachers is of vital importance. It is, of course, related to the communications problem which I have just been discussing. We noted that the USOE is now turning its attention to people. The USOE has been in the hardware-software phases, but is now going to put heavy emphasis on people. In the future, the USOE will place heavy emphasis on what can be done to prepare educational personnel. Attention will be given to in-service as well as pre-service education in order to help teachers utilize new media and the newer teaching techniques.

We talked also about the significance of the recent institutes for media personnel and teachers in various subject fields. Media were a very prominent feature of these institutes.

Our group is very hopeful that the current appraisal of the results of these institutes will substantiate our ardent hopes that these institutes have been of great value in advancing modern education. We think we will reap benefits from these institutes for several years to come. There have been between 6,000 and 8,000 participants in those institutes.

It was also suggested that future Federal legislation will undoubtedly be developed in terms of the results of the appraisal of these institutes or at least the appraisal will have significant effect on future Federal legislation.

Industry must also assume major responsibility for educating teachers, especially those in-service, to use the newer communications media. It was made explicit, I think, that this responsibility will be particularly urgent as we begin to adopt and utilize major instructional systems as a common practice.

We have noted the influence of the Federal Government on the establishment of standards through the granting of funds. We have pointed out the role of government in dissemination of information. Another point is that the influence of categorical aid which we have been having in recent years, is very, very marked on the development of the curriculum; and as educators concerned about the development of elementary, secondary, and higher education in this country, we must give this matter serious attention. We must recognize the potential influence of the knowledge industry on the development of curriculum.

We, too, talked about new names. We agreed that it is an urgent but not a simple problem. It is actually very complex in nature. Some new names I heard were short films, short single subject films, cartridge loop films, chaptered films, all of which you have also heard before, here and elsewhere. How short is short? When is short no longer short? I guess I can summarize our discussion of the new name by saying that maybe his name really is Pluto, but if everyone else calls him Rover, we might just as well call him Rover, too, and get on with other matters of more importance.

The commercial representatives in our group were quick to tell us that there is not enough information available to those concerned with surveying the market. I tried to press for some specifics as to what they wanted. In general, they want more information about the utilization of existing materials and the potential utilization of future materials. Industry wants to know what it is the educator really wants. The answer is not a simple one in that American society is, and always has been, pluralist. However, I think this is a fact of life which is most fortunate and with which we should thankfully live.

Obviously, in the light of what I said earlier about communication, the values of this conference will depend on the extent and the effectiveness of our efforts to communicate what we have learned to our professional colleagues. And let's not forget that the individual classroom is one of our professional colleagues. Another value of this conference grows out of our personal contact. As one individual in our group said, "Some of the best ideas emerged from our conversations in the halls as we stand around the coffee urn." Personally, I have enjoyed being here. I found the formal sessions as well as the informal sessions around the coffee urn extremely valuable. I would like to express my personal thanks to the planners of this Conference for giving me the privilege of being here.

CHAPTER XIII

Dr. James Brown

Is the 8mm really a different medium? In the opinion of our group, we decided it is not a different medium. Rather it is a film in a different format---one that offers lots of possibilities that we should capitalize upon. Two possibilities that seem quite obvious are these: (1) low cost, which may enable us to have films for the first time, really, in every classroom, and (2) ease of use, brought about, particularly, through recent developments in film cartridging.

There were some in our group, however, who thought that the 8mm film should be regarded as a different medium. One of the reasons put forth for this view was the possibility of using films of this type in "chaptered sequences" or, divided somewhat along the lines suggested in Bob Wagner's presentation of yesterday. There were some in our group, too, who felt that the 8mm producer should keep in mind that a potential use of his product might be on a one-to-one intimate basis such as might occur with individual projection on a cartridge-type projector in a carrel.

What about terminology? We were somewhat confused in our group on terminology. So we looked for the best term to use. We really didn't come up with a "best one," perhaps, but the one we used most frequently was just plain "short film."

What size is best for the short film? Our group decided that Super 8 was the best, and that we might as well encourage the present trend and cooperate with the "inevitable." Super 8 has been part of Eastman's corporate plans for years, we find, and Eastman seems to believe that 8mm Super is the format that should gain greatest favor in the market. The fact that many schools now have access to standard 8mm equipment was not considered by our group to be a particularly important reason for future standardization in that size.

Sound vs. silent: what is better? Whether any one film should be silent or sound depends, we thought, upon its subject matter, purpose, and intended use. Preferably though, we said, even sound films should be capable of being used silently---without seriously handicapping communication, and especially if instructor commentaries are used. We decided that good teaching will often require that any film, whether or not it is produced as a sound film, should be capable of being used silently for certain instructional purposes. We realize that this may make quite a difference in the content and treatment of a particular film. Judging by what the Film Clip Project people discovered in their analysis of their film clips, it would appear that about 50% of them would have had to have been in sound in order to make them fully intelligible to viewers unassisted by instructors. Perhaps if we design short films from scratch, we should keep in mind the fact that it is often a desirable thing to do to use short segments silently with interpretations by teachers or tutors in charge or in some other "non-standard" way.

The silent film days still seem to say something to us that has a bearing on short film production. Perhaps we need to use and to exploit all the tricks of the trade that were used when we made good silent films. Perhaps we should study this art and learn more about communicating in the short film format---without sound track if we want to. Creative and useful productions of many different kinds may result.

Re-doing sound tracks. Our group considered the possibility of re-doing sound tracks (adding new ideas on the spot) to be important in using short films. We were not particularly worried about the further intentional or inadvertent addition of unwanted or inappropriate comments on sound tracks which does seem to have been of considerable concern to lots of people. It seemed to us to be rather unreal to consider this possibility as a deterrent to the use of magnetic track film.

Magnetic vs. optical tracks. Eastman reported in our group that pre-striped 8mm stock will be on the market next Monday. It was quite obvious, I think, that our group favored magnetic track on 8mm in the short film version. We did not see a particular necessity to have a combination of magnetic-optical tracking. When we were given the choice to discuss whether we considered the optical or the magnetic track to be more preferable, I believe I am right in stating that our group favored the magnetic track because of its flexibility of application somewhat along the lines of things mentioned previously in this report.

The decision of our group was to recommend that a magnetic stripe be put on every film when it is sold, whether or not it was pre-recorded. This arrangement would then permit local adaptation possibilities and the adding of desired sound to it. There was the further feeling that magnetic sound, in its present form, could provide better quality sound than presently available optical systems.

What is the most desirable type of projector for 8mm films? Our group said it should be capable of reproducing magnetic sound or of using films silently in cartridge form. It should also be capable of accepting cartridges of many lengths, preferably, but at least the minimum of a 4-minute film. It should be simple to operate so as to capitalize on appealing to teachers who are willing to use films, perhaps only short films, that do not give much trouble in getting and using related equipment. It was believed that there are many times when teachers would only use such short films---when they were very, very easy to get and when there was no bother with complicated projectors. We believed we should keep inexpert persons in mind when designing projectors for 8mm films. Perhaps the greatest amount of use of short 8mm films will be on the one-to-one relationship of the learning carrel involving people who have no technical background for operating equipment. The simpler the better, then, in that particular situation.

Marketing problems. Can we standardize the cartridging of 8mm films? We believed that it would be desirable to standardize on cartridging. We also felt that we should divorce the problem of cartridging from the problems of printing and distributing short films. If possible, we thought, the purchaser should decide the format in which he wishes to have his product cartridged. If this is the case, cartridging probably will have to be available in many formats. There was considerable support in our group for the idea that proper cartridging methods would find their own way in an open market competition and that we should not try to force an early standardization, in this respect, before we are ready for it. There was also the feeling that the marketing of short films in 8mm Standard, 8mm Super, or 16mm format may be wasteful to the consumer, but not that it will be especially wasteful to the producer.

What about the home market? There was a great deal of interest in our group in the home market. We thought generally that this market ought not dictate the educational market's interest and standards. Nevertheless, we agreed that neither should it be ignored. Rather, we thought it deserved to be encouraged. Some believed that libraries---school libraries, as well as public libraries---would also be in the short cartridge film business by loaning out materials in this form as they now loan out books.

We then discussed the home entertainment center. Units in the home that would reproduce 8mm cartridge films were thought to be important. The possibilities of a "box attachment" to an ordinary television set to convert it to a videotape recorder-playback unit were also recognized.

Use in storage and retrieval operations. Uses of short films, and especially those in the 8mm format, for information storage and retrieval (in dial access operations, for example) were also discussed. We decided that we were not yet at the point where much could be said about these developments, yet they must be recognized and considered by those in the field. We appear now to be on the verge of important break-throughs in these areas. Perhaps the producers' real problems are only starting. No doubt new approaches will need to be made to matters pertaining to the recouping of royalties, unauthorized duplications and uses, and the like.

In summary, our group regarded the short film as an essential. It is with us; it is going to stay with us; it is going to grow in importance. There was concern by some that we should emphasize we are talking about short films that are more than simply excerpts from films produced originally as longer, more complete films. We thought something needs to be said for the "art of the short film as a short film"---a film that is originally planned and produced that way. We ourselves should develop our skills and abilities to produce original films in this shorter form with more precision and more effectiveness than we now do. Even with the limitations of time and the physical aspects of a 4-minute, 8mm, and Super 8mm format, there seemed still to be a great deal that can be done to improve the product---especially if we start with the 8mm format in mind. Many producers have done this with a variety of film subjects. The future of the short film looks good.

THE SUMMARY POSITION

The following summarization to the National Conference on Cartridge Films was prepared by the author with the editorial assistance of Mr. Charles L. Bollmann, Assistant Project Director.

CHAPTER XIV
SUMMARY

INTRODUCTION

Many of the suggestions of the Conference participants appear in one form or another in the three summary papers of the small group discussions. Many of them appear there in more than one formulation reflecting different points of view or different aspects of a central notion. An attempt will be made in this section to reflect upon some of the major and recurring points that have appeared previously in either the Conference papers or in the reports of the discussion sessions. These might be termed "major recommendations" or "suggestions" of the February Cartridged Film Conference.

A. Accessibility is the key attribute of the Cartridged film.

There was much agreement with the position of Dr. Louis Forsdale of Teachers College on the "accessibility" feature of the cartridged film. Professor Forsdale has suggested for a number of years that the 8mm film (and also the cartridged film) does in fact make films much more accessible to teachers and students than any other kind of motion picture format. Professor Forsdale suggested that the most important thing (much more important than the Regular 8 vs. Super 8 problem that was discussed at length) is the accessibility feature; that is, the cartridge can eliminate the need for inspection of a film after each use and thus permits the decentralization of film libraries. Films can then be stored much closer to the point of use.

The suggestion was made that it would be inappropriate and inadvisable to wait until all decisions are made concerning 8mm standards before seriously investing money and time into the use of 8mm films in instructional programs. The nature of the 8mm film medium (whether cartridged or not) is such that with good utilization, the materials and the equipment must of necessity be replaced much more often than with other types of motion picture systems. That is, a good library of cartridged films or film clips, coupled with suitable machinery for using them, could very well wear out and need replacement in a much shorter time than 16mm films and equipment. Therefore, in a space of two to three, (certainly no more than five years) normal transitions

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could be made to replace equipment with newer and less obsolete equipment and films, if the 8mm standards do begin to firm up in a particular direction. Therefore, many of the Conference members suggested that the educators are perfectly safe in investing money in regular 8mm equipment and regular 8mm films at this point in time, because with proper utilization these materials will be worn out before they need to be replaced due to newer technological developments in the Super 8 field. This suggestion that school people should get on with the use of film in this medium was made by individuals from the industrial community and by some of the educators present.

B. There is a need for thorough and imaginative research with the short film.

It was felt that short films of this nature can play a major role in the area of research. It was suggested that good, legitimate learning research can be done with the short, cartridged, modular film, and that it is irrelevant whether the particular films appear in a Regular 8 cartridge or a Super 8 cartridges. It was suggested that we need more experience and new applications of films in this format, and that more ideas are likely to result from actually using films of this kind than from a priori hunches.

C. There is a great need for efficient dissemination of information about innovations with short films.

It was agreed that we have grave problems in disseminating information about educational innovations in general and cartridged films in particular. At this time there simply is not an effective and rapid way to get up-to-date and accurate information about innovations out to educators at the local level. Of several methods suggested by the Conferees, the publication of a Life-like format picture publication devoted to innovations in education was well received. It was suggested that the U.S. Office of Education might well look into the sponsorship of this kind of dissemination vehicle.

It was also suggested that 8mm films themselves might be made about educational innovations (such as the Single Concept Film Clip Project) and released to the field to use for dissemination purposes. It was also suggested that a series of film loops might well be made on this Conference and the suggestions resulting from it. Film loops also might be useable in disseminating information in all areas of educational innovation as well as about themselves.

It was generally agreed by the Conferees that good dissemination would provide for "cross-fertilization" of information between the various disciplines per se. The Conference members were also almost totally agreed that serious attention needs to be given to the dissemination of information within the vast and encompassing field of education.

D. Short films are desperately needed in instructional television programing.

The entire question of the use of film clips (whether they be on 8mm or 16mm), in television instruction was discussed during the meeting. No firm recommendations were made but some serious questions were raised. There is little doubt that educators would like to begin to use short segments of films (such as single concept films) in their television programing for instructional purposes. It was agreed that film resource materials are sorely needed by professors and teachers who are designing and programing television learning experiences. Cartridge films, it was thought, could meet this need.

There also seems little doubt that film producers would like to find a way in which this could be done. The problem lies in the copyright area, and procedures acceptable to producers and educators have not yet been developed. An uncumbersome way must be found for school people to obtain permission to use films in this way while insuring film producers a reasonable royalty or payment for such use.

It was suggested by the educators that the film producers should get together in their own professional association, perhaps the National Audio Visual Association, to develop workable procedures of this nature. It was suggested by the film producers that educators ought not to stand by and wait for this to happen, but should take part in the development of a set of workable regulations.

E. In the short-range, educators should use what is available now. In the long-range, standards will be determined in the market place.

It was suggested that industrial people (including both filmmakers and machine manufacturers) and educators should devise plans aimed at a short-range point of view. There are in effect two 8mm film systems: the Regular 8mm format and the newer Super 8 system. The former is rather common, with many more units in operation than the latter. Again, as indicated in the first section of this summary, the suggestion was made that the school people should not wait for all decisions to be made before they enter into the use of films of this medium. It was suggested that in the short-range, the use of materials which are available now is appropriate, and that, in the long-range (perhaps three to ten years), suitable and rational plans should be developed for making the transition to newer and better systems as they become available.

On the other side of this question, comments from many Conference participants reflected the feeling that some decisions do need to be made now and some definite commitments should be made both by users and materials producers insofar as Regular 8 and Super 8 are concerned. It was suggested that a time schedule of some kind might be set up so that the buyer would know, for example, that Regular 8 materials would be available in quantity for three, four, or perhaps five years, after which a transition would be made. Others, however, disagreed on this point, saying that the major decisions will be and properly should be made in the market place. Since it is very difficult to predict when a transitional time might arrive, this question was left unresolved in spite of the amount of time spent on it.

F. No definitive statement with regard to standards was developed. It was agreed, however, that standards would necessarily be determined in the market place.

A considerable amount of time was given to the discussion of the two major divergencies that have appeared in the 8mm field. Included were discussions of the Regular 8 vs. Super 8 film format and the magnetic-stripe film vs. the optical track film. In general, the Conferees agreed that the decisions on these basic points would not be made on a rational, pre-planned and cooperative basis within the industry, but rather in the open market place. It was suggested by Conference members that a decision to sit down and jointly to hammer out standards before the fact would be treading into the area of monopolistic, illegal activities and that participants in such cooperative endeavors might be subject to Federal anti-trust action.

It was generally agreed that different companies would more than likely take different approaches to these questions and that the final standard would be decided in the open market place. Some system(s) will win out because of their inherent value, or because of fortuitous timing in their introduction. Basically, decisions on standards will be based upon what sells. The people from industry suggested that the educators would in effect set the standards with their purchase decisions. On the other hand, the educators tended to say that it would be easier if industry were to set certain standards so that anybody's film would fit anybody's machine, (or even more hopefully, anyone's cartridge would fit anyone's machine).

It should be injected here that Dr. Ray Wyman of the University of Massachusetts made a pertinent point with his statement that:

> "Meanwhile back in the classroom, the classroom teacher is basically demanding a new freedom to add this limited concept short film to the classroom learning materials. She now has several of them. She can use anybody's chalk on anybody's chalkboard, and anybody's overhead transparency on anybody's projector, with very few exceptions anybody's 16mm sound film on anybody's projector. When is the day going to come when we can add anybody's limited-concept motion picture to anybody's machine so that we can have this new freedom to add this free motion episode to a regular classroom learning situation. Now somehow this group needs to wrestle with this situation and come to some sort of solution so that this classroom teacher, multiplied by many thousands, can have this new motion picture technology in the classrooms. What the answer is, I don't know, but we simply can't go in all these different directions and say, 'you choose this, go with this and then nobody else can use what you are using'."

In reply to Mr. Wyman, the suggestion was made that indeed some of the other systems which he mentioned took some time in the open market to establish standards now generally accepted in the education and industrial community, and that those standards were not established overnight nor in a preconceived way at conferences like the present one.

Mr. William Offenhauser, an independent consultant from New Canaan, Connecticut, suggested that it might not be a bad idea to include the American Standards Association in the discussion of standards for the 8mm single concept, cartridged film field. It was also suggested that the Standards Committee of the Society of Motion Picture & Television Engineers should be appraised of the concern of this Conference, and the Conference Planners were instructed to forward some of these concerns to the SMPTE. The Society, however, has already dealt with this problem in some respects without reaching any greater degree of agreement than did the February Conference.

It was suggested that the general European decision (particularly in Great Britan) to stay with Regular 8 should not deter us from going ahead with the development of newer and better systems for handling 8mm images. Even in Europe, the Germans have indicated that they may establish Super 8 as their standard.

G. Adequate information about the content of short films might eliminate the necessity of previewing the actual films.

Mr. Carl Nater, of the Walt Disney organization, injected the producer's problem of providing preview sets of film loops. The preview problem has always been a thorny problem for the film producers to deal with. The fact that already more than 4,000 film loops are available makes this concern about marketing technique a crucial consideration. Audiovisual directors cannot possibly look at the total collections of film loops before making purchases. It was suggested that random sampling of a set of film loops was sufficient.

The Film Clip Project staff, however, suggested that even random sampling of the films themselves is not a very rational way to solve the problem, but that information about the loops must be used in reaching utilization decisions. Such summary data can be organized into computer-controlled information banks where it can be efficiently searched. The technology is available to do this, and yet it is absolutely necessary for film producers to let an unbiased party write (in standard patterns) informational segments about the films. The Project staff found it difficult, if not impossible, to do this from the descriptions of films as provided by the film producers. It was suggested that a cooperative endeavor among the film producers to put together such an "information bank" about all single concept film loops would repay them many times over. Then a central repository could provide all pertinent information about available loops on any given subject to the prospective purchaser who would then forego previewing the actual film material.

CONCLUSION

The writer of this summary would suggest to the reader who is concerned with the directions and points of view expressed during the Conference, that he read very carefully the papers included in this report. Much relevant material is to be found in the papers of the three Conference summarizers, Dr. Paul Witt, Dr. Gabriel Ofiesh, and Dr. James Brown. Those three papers and the other major Conference papers contain virtually all of the concerns raised and suggestions made at the February National Conference on Cartridged Films at Michigan State University.

CHAPTER XV

PARTICIPANTS

Michigan State University
Participants Attending
Cartridged Films Conference
February 22-24, 1967

BAILEY, Albert Mr.
BAILEY FILMS, INC.

BALDWIN, Thomas Dr.
MICHIGAN STATE UNIVERSITY

BARR, Donald Mr.
ARTHUR BARR PRODUCTIONS, INC.

BARSON, John Dr.
MICHIGAN STATE UNIVERSITY

BECKWITH, Hugh Mr.
BECKWITH & ASSOCIATES

BOEKEMEIER, Barbara Mrs.
EYE GATE HOUSE, INC.

BOLLMANN, Charles Mr.
MICHIGAN STATE UNIVERSITY

BOWER, Joseph S. Mr.
ENCYCLOPAEDIA BRITANNICA

BRANDOU, Julian R. Dr.
MICHIGAN STATE UNIVERSITY

BROWN, James W. Dr.
SAN JOSE STATE COLLEGE

BRYAN, Julien Mr.
INTERNATIONAL FILM FOUNDATION

CALVER, D.R. Mr.
GRAFLEX, INC.

CARPENTER, C.R. Dr.
PENN STATE COLLEGE

CHILDS, John Dr.
WAYNE STATE UNIVERSITY

COX, Alva I. Jr. Mr.
NATIONAL COUNCIL OF CHURCHES

DACCURSO, Salvatore V. Mr.
JAYARK INSTRUMENTS CORP.

DEVEREAUX, Alfred E. Mr.
EYE GATE PRODUCTIONS, INC.

DUHAMEL, E. Donald Mr.
A.B. DICK COMPANY

EDEN, Tom Mr.
LEKAS PRODUCTS

FINN, James D. Dr.
UNIV. OF SOUTHERN CALIF.

FORSDALE, Louis Prof.
TEACHERS COLLEGE, COLUMBIA UNIV.

GENTRY, Castelle G. Dr.
UNIVERSITY OF MAINE

GEORGIADY, Nicholas P. Mr.
MICHIGAN DEPT. OF EDUCATION

GEARHART, Richard C. Mr.
EASTMAN KODAK COMPANY

GERLACH, Vernon Prof.
ARIZONA STATE UNIVERSITY

GOUGH, John A. Mr.
OFFICE OF EDUCATION

HANNA, Ardith Mrs.
MICHIGAN STATE UNIVERSITY

HANSEN, Helge E. Dr.
DEARBORN PUBLIC SCHOOLS

78-175

HANSON, Stanley J. Mr.
AUDION CORPORATION

HARTSELL, Horace Dr.
MICHIGAN STATE UNIVERSITY

HOBACK, Frank J. Mr.
BELL & HOWELL COMPANY

HODGES, Marvin P. Mr.
EASTMAN KODAK COMPANY

HUNT, G. Carleton Mr.
DE LUXE LABORATORIES

JOHNSON, Walter E. Mr.
SOCIETY FOR VISUAL EDUCATION

KNIRK, Frederick Mr.
INSTITUTE FOR EDUCATIONAL DEVELOPMENT

KREIMAN, Robert Mr.
TECHNICOLOR CORPORATION

LEKAS, John P. Mr.
LEKAS PRODUCTS

LE MAY, James E. Mr.
CORONET INSTRUCTIONAL FILMS

LEWIS, Stephen Mr.
SCIENCE RESEARCH ASSOCIATES

MC COY, Edward Prof.
MICHIGAN STATE UNIVERSITY

MAC FARLENE, R.T. Mr.
GRAFLEX, INC.

MALCOLM, Rex Mr.
FILM ASSOCIATES

MILLER, Elwood E. Dr.
MICHIGAN STATE UNIVERSITY

MYERS, Nat Jr. Mr.
FAIRCHILD INDUSTRIAL PRODUCTIONS

NATER, Carl Mr.
WALT DISNEY 16mm FILMS

NORBERG, Kenneth Prof.
SACRAMENTO STATE COLLEGE

OFFENHAUSER, William H.,Jr. Mr.
CONSULTANT

OFIESH, Gabriel D. Dr.
THE CATHOLIC UNIV. OF AMERICA

PAGE, James L. Dr.
MICHIGAN STATE UNIVERSITY

PEIREZ, Ben Mr.
VIEWLEX, INC.

PFAFF, Gunter Mr.
MICHIGAN STATE UNIVERSITY

PHEND, Harold W. Mr.
AMERICAN SOCIETY FOR METALS

RIDGWAY, David W. Mr.
CHEMICAL EDUCATION MATERIAL STUDY

ROMANO, Louis Dr.
MICHIGAN STATE UNIVERSITY

ROSENBERG, Albert J. Mr.
MC GRAW-HILL BOOK COMPANY

RUFFING, Charles Mr.
MICHIGAN STATE DEPT. OF EDUCATION

SAKS, Lewis Mr.
EAST DETROIT PUBLIC SCHOOLS

SCHULLER, Charles F. Dr.
MICHIGAN STATE UNIVERSITY

SCOTT, Robert T. Mr.
EASTMAN KODAK COMPANY

SHERMAN, Mendel Dr.
INDIANA UNIVERSITY

SNIDER, Robert C. Dr.
NATIONAL EDUCATION ASSOC.

STIFLE, E.M. Mr.
SMPTE

SUCHY, Robert R. Mr.
MILWAUKEE PUBLIC SCHOOLS

TAYLOR, Vi Marie Dr.
OKEMOS PUBLIC SCHOOLS

TAYLOR, W.R.K., Jr. Mr.
PANACOLOR, INC.

TAYLOR, T. Wayne Dr.
MICHIGAN STATE UNIVERSITY

TRINKLEIN, Lloyd D. Dr.
SHIPPENSBURG STATE COLLEGE

VAN MOURICK, Lawrence L., Jr. Mr.
INTERNATIONAL COMMUNICATION
FOUNDATION

WAGNER, Robert Dr.
OHIO STATE UNIVERSITY

WATSON, Archie E. Mr.
MICHIGAN STATE UNIVERSITY

WHITE, Don Mr.
NATIONAL AUDIO-VISUAL ASSOC.

WITT, Paul W.F. Prof.
TEACHERS COLLEGE, COLUMBIA UNIV.

WITTICH, Walter A. Dr.
UNIVERSITY OF HAWAII

WYMAN, Raymond Dr.
UNIVERSITY OF MASS.

JONES, David Mr.
MICHIGAN STATE UNIVERSITY

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FINAL REPORT
CONTRACT NUMBER OE-4-16-030

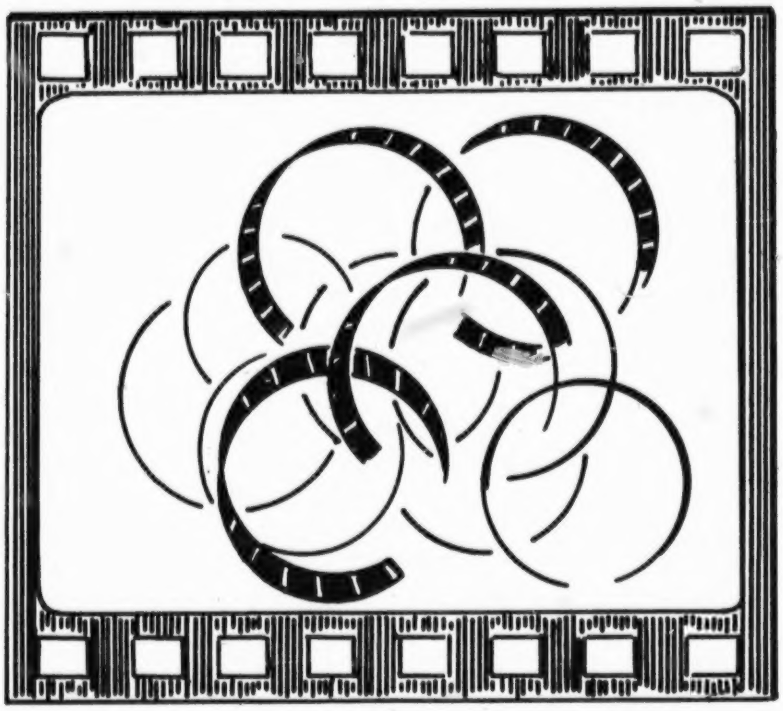
The Michigan State University

SINGLE CONCEPT FILM CLIP PROJECT

Part II

FINAL PROJECT REPORT

December 1, 1967



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SINGLE CONCEPT FILM CLIP PROJECT

Part II

FINAL PROJECT REPORT

OE-4-16-030

Dr. Elwood E. Miller, Project Director

December 1, 1967

The research reported herein was performed Pursuant to a contract with the Office of Education, U.S. Department of Health, Education and Welfare. Contractors undertaking such projects under Government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

MICHIGAN STATE UNIVERSITY

East Lansing, Michigan

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The Single Concept Film Clip Project at Michigan State was, in the best sense of the term, a team effort. The author wishes to formally acknowledge the efforts of the many individuals who assisted in the study. Especially valuable were the long-term efforts of the following individuals:

Dr. Charles F. Schuller, Project Chairman and Director of the Instructional Media Center, Michigan State University.

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Mrs. Ardith Hanna, Huron Valley School System, Milford, Michigan.

Mr. David Jones, Michigan State University.

Mr. Gunter Phaff, Michigan State University.

The following faculty members of Michigan State University served as the Advisory Committee:

Dr. Charles F. Schuller, Chairman

Dr. John M. Mason

Dr. T. Wayne Taylor

Dr. Julian R. Brandou

Dr. Horace C. Hartsell

Dr. Lawrence M. Sommers

Dr. John A. Ramsey

Dr. James L. Page

Professor Edward P. McCoy

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The efforts of the men and women listed above represent something more than a general interest in the work of the Project.

The Director wishes to recognize the high degree of professional commitment evidenced by these individuals on behalf of the Project. The generalized nature of the investigation made it necessary for us to seek advice from a multitude of individuals both in the educational community and in the business community. Their time, effort, interest, and advice is deeply appreciated.

Elwood E. Miller
Director
Single Concept Film Clip Project
Instructional Media Center
Michigan State University
East Lansing, Michigan
November, 1967

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I. INTRODUCTION

Short, single concept, looped-type films have been used in educational patterns for many, many years. As early as 1929, Wood and Freeman[1] wrote that the time would come when short, one-idea films would be produced and find a place in instruction.

For many years, teachers have used parts of films on traditional projection systems to illustrate single principles or ideas. In the 1930's, film loops illustrating single concepts were produced at the Pennsylvania State University.

But it was not until the introduction of the Technicolor Cartridged Single Concept projector in 1962 that the time seemed to be really ripe for the widespread use of the short, single concept, modular type motion picture in instruction.

Several staff members of the Michigan State University's Audiovisual Center (since renamed Instructional Media Center) suggested in 1963 that the widespread introduction and application of such single concept films raised a number of rather serious problems. They suggested to the U.S. Office of Education that some research funds be advanced to identify and explore some of these problems. The Single Concept Film Clip Project, Contract Number OE-4-16-030, was the result of this mutual concern.

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[1] Ben D. Wood and Frank N. Freeman, Motion Pictures in the Classroom (New York: Houghton Mifflin Company, 1929), p. 224-226.

The Problem

Three major problems were identified as being areas for intensive investigation in the single concept field. The contract, agreed to by the U.S. Office of Education and Michigan State University, contained provisions for exploring all three of these general problem areas.

1) The first problem is one of quantity. It becomes quite obvious as one thinks about the one-idea or single concept film, that literally tens of thousands of these film gems must be available for instructional purposes, if the general idea is to have any validity. Just as libraries must contain thousands of volumes in order to be effective, single concept film collections must contain thousands of clips in each general subject matter field if they are to be effective.

   Original production is a highly complex and extremely expensive method of preparing films. It was suggested that within the existing 30,000 or so 16mm films, there might be many segments that could be extracted, edited, marketed, and used as single concept films. The first charge of the contract, then, was to explore the possibility of excerpting from existing films short segments that might fit the general criteria of a single concept film. Film producers were contacted and requested to supply films (at print cost) for the staff to study. In general, the response from most film producers was very positive, and only in a few instances was the Project refused permission to examine and to cut existing educational films.

2) It was readily apparent from the beginning that another major area of concern should be an information system to retrieve such film segments or single concept films at appropriate times in instructional patterns. Although traditional library methods were to be considered, it was suggested that the potential volume of short films would require a computerized information system. The Project spent considerable time in pursuing this phase of the contract agreement.

3) Economic and engineering considerations seemed to indicate, in the early 1960's, that the 8mm format would be the most logical system for single concept films. Unfortunately, some divergence of opinion appeared within the business community in terms of standards. Three different formats of 8mm films were introduced and marketed in various combinations with optical and magnetic sound tracks. Thus, the third major area of concern to the Project was that of exploring reasonable standards and equipment for single concept films. This phase of the investigation eventually lead to the National Conference on Cartridged Films in February of 1967, reported in Part I of the Final Report of the Single Concept Film Clip Project to the U.S. Office of Education.

The Purpose

The purpose of the Project, as stated in the contract, was "to develop practicable systems for the selection, storage, retrieval, maintenance, information dissemination, distribution and projection of single concept film clips from existing instructional films and, when these are achieved, to provide educational and producing agencies with the information and practical methods by which comparable systems can be established."

In summary, the basic purpose of the investigation was to move the idea of single concept films toward an effective utilization goal in order to provide these kinds of educational resource materials to teachers and educators in as rapid manner as possible. To this end, the Project staff has worked for three years.

II. METHOD

For many years, portions of existing instructional films have been excerpted for various purposes. Television illustrations, classroom experiences, and motivational footage are examples of film types that have been excerpted on a limited and sporadic basis. The introduction of an inexpensive cartridge projector in 1961 created a need for large numbers of such single concept films. Michigan State University proposed the Single Concept Film Clip Project to help fill this obvious "film gap."

What Is A Single Concept Film?

Although there is some question about the appropriateness of the term "single-concept" film, for the purposes of the Michigan State University project, it was defined as a short segment of film with a small, discrete, and describable instructional content. Commercially, the best known example of such films are those in four-minute, closed-loop cartridges.

Overall Project Objective

In 1964, the United States Office of Education provided funds for the University to operate a Single Concept Film Clip Project charged with developing practicable systems for the selection, storage, maintenance, retrieval, distribution, and projection of film clips (single-concept, closed-loop films) from existing 16mm instructional films. Films were surveyed and excerpted in the areas of foreign languages, science, and the social sciences. Although vital relationships exist between film size, speed, audience size, cost of projectors, and film material, the major concern of the project planners and operating staff was that of the short, closed-loop filmed sequences regardless of film format.

EXCERPTING PROCEDURES

Previewer-Excerpters

Since the film excerpters were, in effect, to make decisions of a basic nature for classroom teachers and learners, excerpters were chosen on the basis of their subject matter competence and teaching experience.

Five basic steps evolved in the process of studying and selecting film excerpts. We believe these steps will be a useful guide for others interested in excerpting films.

Film Selection

Catalogs and brochures were searched for promising films which were then ordered and previewed. Many of the previewed films were retained for excerpting while others were rejected for any of the following reasons: (1) outdated; (2) disjointed; (3) too short; (4) too much dialogue between people visually involved in the film; (5) weak visual channel compared to audio; (6) poor coordination between picture and narration.

Clip Search

Searching for clips was the heart of the process and the most difficult step in the procedure. Clues for identifying excerpts were found to be either directorial (for example; fades, abrupt jumps, written questions, or outline elements inserted in the visual channel) or subtler cues in either the visual or audio channel.

The excerpter marked the segments on the film itself and made entries on an editing card to provide the following information: (1) Systematic starting point; (2) footage location of each clip; (3) clip titles; (4) usage and level designations; (5) additional instructions to the film editor.

Film Cutting

The film editor then cut the identified film segments from the original print and wound them on a small plastic reel.

Reworking Clips

Approximately two weeks later the excerpter again viewed the clip, but this time in isolation. Some clips were acceptable "as is," a few were rejected, and others needed to be changed by additions or deletions. The previewer wrote specifications for inserts and "supers" which are necessary to convert part of a sound film into a single concept film. If the excerpt was to be given full production treatment, the art work for such additions had to be prepared, photographed, and added to the film in a laboratory process using a "B" roll to make a new internegative.

The previewer also carefully reconsidered the descriptive title of the excerpt at this time. This data was crucial for developing retrieval schemes.

Treatment Sheets

The final step was the preparation of a "treatment sheet." Data about the physical characteristics were copied on the sheet from the editing card. Then the previewer wrote a summary of the excerpt in which the most important terms were underlined as primary terms. In many cases, a list of secondary terms was also added, and both the primary and secondary terms were used as index entries for later retrieval of the excerpt. The summary itself was kept short enough to place on the cartridge, box, or reel which might contain the film excerpt. The treatment sheet was then duplicated and copies were distributed to the previewer, librarian, and film producer.

INFORMATION RETRIEVAL

It is clear that the establishment and efficient use of large collections of single concept films will depend upon effective ways to find films on a specific topic with a minimum of difficulty. The project librarian used the information contained in the treatment sheets to design two systems which attacked this problem of information storage and retrieval.

Coordinate Indexing

The more sophisticated of the two was a coordinate indexing system which was applied to the excerpts in two formats, a manual system and a computerized system. Both coordinate systems utilized standard computer tab cards.

In the manual application, a thesaurus of coded key terms drawn from the treatment sheets was maintained on 3 x 5 index cards. Each key term was also represented by a computer tab card on which holes were punched representing the "address" of each clip related to that term. By placing two or more cards in register before a strong light or over a black background, coordinated addresses of all clips corresponding to that combination of terms can be revealed. The capacity of this manual system is 800 clips.

A computerized application was developed. The thesaurus employed was identical to that of the manual system. Because machine searching extends the useful size of the information collection, the computerized application is not limited to 800 clips as is the manual system. The techniques of coding and searching for information are essentially the same in each case, except that in the computerized system electronic matching of key terms replaces the visual matching of the manual system.

A detailed description of the application of computer technology to indexing is described in detail in Part I of the final report. Several trial searches were conducted during the investigation, and are illustrated in Appendix A-7 & A-8.

Conventional Indexing

For purposes of comparison a conventional file card index system also was prepared. Entries included clip titles, key words, and subject areas based on school curricula. Search routines were initiated simultaneously in the conventional index and the manual version of the coordinate system to test their relative efficiency.

PROJECTION EQUIPMENT

Developments To Date

Although the project personnel were not committed to any one film size and format at the conclusion of the study, the only projectors which offered "plug-in," non-threading cartridges were in 8mm.

The first projector to reach the market offered this essential feature of simplified operation at a minimum cost. In January of 1966, a similar machine was introduced in the new Super 8mm format. The film cartridges were similar to, but incompatible with, those for regular 8mm. The cartridges for both formats can comfortably hold a maximum of four minutes of film.

Sound tape cartridges and a playback unit, designed for use with the existing machines, were also available. The film can be notched to start and stop at desired places in the tape commentary. Although it is difficult to achieve perfect (lip-sync style) synchronization, a variable-speed control added to the projector allows for necessary speed adjustment.

Future Machines

The project staff is convinced that a sound-on-film cartridge machines of moderate cost is needed. Several such machines have been introduced, or are likely to make their appearance in the near future. To our knowledge, all of these machines are 8mm with either a magnetic striping or an optical sound track. Probably some of the machines will accept cartridges with different film capacities. Some may incorporate reel-to-reel designs with fast forward and rewind modes rather than the endless loop arrangement used thus far.

III. RESULTS

The results of the Michigan State University/U.S. Office of Education contract concerning single concept film clips and their applications to instruction, can be subdivided into three generalized statements.

The Excerpting Problem

Approximately one thousand films of commerical producers were studied in the course of the investigation. Approximately 50% were rejected as not being useful in the retrieval of single concept films.

Of the 460 films which produced single concept clips, 1253 clips were identified. Of these 1253 identified clips, 818 were found to be useful at the second stage of study. These 818 clips were described carefully and the information was returned to the film producers with the suggestion that they might well use this information and this system for retrieving such single concept films from their existing libraries. We encouraged the producers to market such film clips. Samples of the treatment sheets sent to film producers on the 818 clips are found in Appendix A-10.

A five point procedure was developed and is described in the earlier section (II. Methods) of the report. Such a procedure, we think, would be useful to any film producer who wishes to examine his own films and retrieve single concept segments for marketing.

The Information Problem

The examination of the problem of retrieving the correct film clip to match an identified curriculum situation resulted in the development of two schemes for cataloging and organizing film clips. One followed a conventional library type cross-referencing system. It was abandoned in favor of a coordinate indexing system. Conventional indexing was inadequate for the large amount of data available.

The second was a coordinate indexing system useful for film clip collections. One form used a computer tab card "hand search" system. A more useful form (for large clip collections) was obtained by placing the same information in computer banks for systematic computer search. The system was an implementation of BIRS (Basic Information Retrieval System) devised under a U.S. Office of Education contract, with the Learning Systems Institute of Michigan State University.

Experimental work was done by addressing specific questions to the computer. An examination was then made of the information drops from the computer to see what correlation existed between the question and the drop. A high degree of correlation was found, with the major limitation being one of an inadequate amount of information available in the computer storage banks.

We suggested that such a system be adopted by film producers as the answer to many of their preview and information retrieval problems.

The Equipment Problem

The concern with equipment and standards for the single concept field led to the National Conference on Cartridged Films held at Michigan State University on February 22, 23, 24, 1967. The complete report of the Conference is reported as Part I of the Final Report of the Single Concept Film Clip Project.

IV. DISCUSSION

Several points need to be made in order to understand some of the positions taken by Project members on the Film Clip staff.

In the first place, we rapidly concluded that original production of film clips, based upon the identification of a learning need, was a superior way in which to build a suitable library of single concept materials. Because of the extremely high expense and long time-lapse necessary for original production of clips, we suggested that many existing films could, in fact, be used to fill this gap until such time as more sophisicated and better materials are produced.

Reinforcement for this hypothesis appeared within a year. Several film producers did, in fact, begin to excerpt segments from their films and place them on the market in the single concept form. Many of the producers followed our suggestions.

A major problem remains in terms of the information retrieval study. Film producers need to be convinced that they must cooperatively catalog their materials in order to cope with an information problem of increasing complexity. An industry-wide effort to catalog materials should be undertaken. In order for educators to identify the sources of badly needed materials, the system must contain within its data banks a description of all such films in existence. The remaining problem simply is the question, who is to describe each of the single concept film clips?

It is our suggestion that a non-interested, third party must write the description of the film, before it is entered into the computer based information system. At this point in time, few film producers have indicated a willingness to do this. We suggest that until such time as film producers do cooperatively manage their information about single concept films, it will be very difficult for the consumer to identify and purchase appropriate materials.

Staff members of the project have frequently been asked to identify the average length of a single concept film. Appendix A-2 describes in detail some statistical findings of the investigation in this regard. The figures indicate that single concept films range in length from 20 seconds to 10 minutes. However, it is very interesting to note that some 67%, of all clips identified, fall in the range of more than 2 but less than 3 minutes. It is our suggestion that the 2 to 3 minute film may very well be the logical element in an information system where motion picture type images are being used, and used repetitively, in learning situations.

Until more learning research is done on the amount and number of bits of information that can be compressed into a given time period, the 2 to 3 minute film range seems to be a significant finding of the single concept film clip investigation.

A major concern of the entire Project staff (people who really are committed to the idea of the single concept, modular film), is the lack of standards in the 8mm field. It is entirely possible that because of an unwillingness on the part of industry to arrive at rational standards, some other audiovisual system for retrieving information might well replace 8mm film. Eight millimeter is a logical, low cost, easy to handle mechanical system for managing single concept filmed information. The differences among equipment manufacturers and film producers in what standards to support may very well cause the single concept motion picture idea to become more generally available on some other audiovisual system. Only the future will answer this concern of the Project staff.

V. CONCLUSIONS, RECOMMENDATIONS, AND PROJECTIONS

General Position

The Project has demonstrated that it is feasible to excerpt discrete segments from existing films for use as single-concept films. We are convinced that excerpting procedures can help to create a large pool of single concept films in a relatively short time. Although the actual production of such excerpted films is beyond the scope of this project, we urge the producers of instructional films to investigate the possibilities of excerpting from their existing footage. It is hoped that the conclusions and recommendations in our final report will contribute to the success of such endeavors.

Main Findings

1. Excerpting does not seem to weaken the teaching power of strong films nor does it improve that of poor films.
2. Existing sound films are more productive of sound clips than silent clips because extensive re-editing to convert to silent may absorb any savings over original productions.
3. Excerpters must have real competence in the subject matter being examined and should be

experienced teachers.

4. It is comparatively easy to teach a person who is competent in subject matter enough about film so that he can become a good excerpter.
5. The project staff completed 807 treatment sheets on clips selected from 1253 film excerpts involving 460 films. Usable films produced an average of 3.25 clips, ranging in length from thirty seconds to more than five minutes. Two thirds of all clips selected were within the 2 to 3 minute range.

Recommendations

1. The project staff feels that some standardization of equipment is urgently needed. There are already three 8mm formats (standard, super 8, and "M"), and others have been proposed. We do not foresee the possibility of interchangeability of cartridges among competing machines, but there must be interchangeability of film between competing cartridges.
2. New projectors should provide at least two film speeds so that films reduced from 16mm can be run at the speed at which they were shot--24 frames per second. (Current 8mm machines run at 16 or 18 frames per second.)

3. Future machines should accommodate cartridges of different sizes to add even greater flexibility of use. (A reel-to-reel design may be the best way to achieve this advantage.)
4. It is both desirable and necessary for new machines to have sound capability. The decision between optical and magnetic sound should be made on the basis of cost to the consumer and restrictions of machine design.
5. Research is needed to determine how single-concept films can be used to best advantage in instructional patterns.

What's Ahead????

The Project staff believes that short, cartridged films are essentially a new medium because the short format and simplified projection systems make possible new methods of using films. Cartridged films will supplement but not supplant conventional 16mm instructional films. This medium is not a panacea to save education nor just a pep pill for the media field. It can be a valuable and basic aid to instruction.

4

Some of the possible uses which we foresee are:

1. A type of encyclopedia on film might be developed.

2. A series of single-concept films might accompany regular length, instructional films to give further depth to topics in the longer film.
3. Film clip libraries, similar in breadth to current film strip collections, might be organized in individual school buildings.
4. A wide variety of filmed "for instances" might be effectively used in instructional television.
5. Filmed illustrations in this format may be valuable in teacher training.
6. Materials for this medium might be made, as a common practice, by individual school systems and teachers, as suggested by Dr. Louis Forsdale and his staff at the Horace-Mann Lincoln Institute of Columbia University.
7. Loan collections of cartridged films owned by public and school libraries might be made available to students and the general public for home study.

It is important to note that the Single Concept Project was conceived and was operated as a feasibility study. No clips or single concept films are available from the Media Center at Michigan State University. It was never the function of the project to organize and circulate a library of such materials. The clips identified and treated were used only for research, demonstration and study. The materials described and suggested are available only from the original producer of the film, and only within the policies and procedures defined by the owner of the original film. A listing of the cooperating film producers is available in Appendix A-9.

We would suggest that the information about the films, identified in the project's work, is of considerably more interest to film producers, researchers, or film designers, than to potential users of single concept films.

VI. THE DOCUMENTS OF THE PROJECT

The Project has produced four documents that represent the final reports of the investigation. Information about the four is available from the Instructional Media Center, Michigan State University, East Lansing, Michigan 48823.

The four documents are:

1. The printed final report of the Project.
2. The printed report of the National Conference on Cartridged Films, including the papers of the conference and a summary of the suggestions resulting from the conference.
3. An Audio Tape transcription of highlights of the National Conference on Cartridged Films held in February of 1967. The tape includes excerpts from the major presentations and portions of the discussion sessions.
4. A filmed interview report on Super 8 film, cartridged and in optical sound.

Information on the purchase or loan of any of the above documents will be provided to those requesting it. The U.S. Office of Education has been provided with copies of all documents, and a resume of the project has been included in ERIC (Educational Research Information Center) at the Office of Education.

In addition to the above formal documents, several articles, papers, and newsletters were published during the course of the investigation. Copies of these reports are included in the Appendix of the Final Report.

VII. APPENDIX

A-1. Details of the Excerpting Phase of the Project

A-2. Analysis of Excerpts

A-3. Film Editors Report

A-4. Time Study

A-5. Editing Card

A-6. Conventional Index Cards

A-7. Manual Coordinate-Index Cards

A-8. Computerized Index Materials

A-9. Cooperating Film Producers

A-10. Sample Treatment Sheets

A-11. Summary of Ancillary Activities

A-12. Dissemination Efforts

A-13. A Bibliography for Single Concept Films

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DETAILS OF THE EXCERPTING PHASE OF THE PROJECT

Introduction

The excerpting phase of the Single Concept Project at Michigan State University was carried on during the academic years 1964-65 and 1965-66. During this phase of the Project, 460 films were excerpted, 1253 single concept films were identified, and 818 treatment sheets were prepared.

Ten excerpters were employed on a part-time basis over the two-year period. Six excerpters were graduate students at Michigan State University, and four were teachers employed in the Lansing and East Lansing school systems.

This chapter is divided into five major sections: (1) basic assumptions underlying the excerpting phase of the Project, (2) the excerpter's reports, (3) excerpting procedures developed by the Project, (4) the film editor's report, and (5) ancillary activities carried on by the Project. Finally, a summary of the entire excerpting phase is given.

Basic Assumptions

Four basic assumptions have formed the framework around which the entire excerpting phase has evolved. These assumptions are presented below.

1. This project has never defended the position that the best method of building a film clip library is via

excerpting procedures. Rather, we would contend that a better method of creating a quality single concept film library is to analyze the various curricula of the major subject matter areas, identifying specific instructional and learning objectives, and then producing suitable clips for those objectives.

The major objections to this technique are the high cost of film production and the extensive time involved in identifying specific objectives for this treatment. It would require years to generate a significant library of single concept films if only this technique were used.

To circumvent the time and economy problems, the basic hypothesis of this study has been that quantities of highly usable and entirely adequate film clips can be identified and excerpted from existing educational motion pictures.

In time these films will be replaced by original productions that would have a higher level of sophistication.

Thus, the fundamental purpose of the excerpting phase of the Project was to investigate the feasibility of excerpting suitable footage from existing films for an interim single concept film collection.

2. The staff of the Project hypothesized early in the study that only individuals with a high level of subject matter

expertise could make the proper excerpting decisions for the films under study. In effect, the excerpters were making decisions for teachers and students to use in the instructional process. To test this hypothesis, a supplementary study was undertaken with a single film and five different individuals, and is reported in the section of this report titled, "The Changing City: A Study into the Nature of Excerpting." The results of this secondary study seemed to reinforce the assumption that subject matter specialists should excerpt only the films within their own disciplines.

3. When the Project was designed, it was assumed that a substantial quantity of films would be available from educational film producers. This assumption was only partially valid; and although a substantial sample of films was made available to the Project, several producers, including one of the major ones, refused to allow the Project to buy or experiment with their films. Since the cooperation of the producers was not as good as had been hoped, the areas in which we could work were limited, especially in subject matter areas other than science.

To secure the cooperation of any film producer, the members of the Project found that it was almost always necessary to meet personally with the head of the film production company to explain the research nature of the project and to assure them that the project would not market the materials provided by the producer. Correspondence usually brought a negative response to a request to use their films, whereas a personal meeting usually was successful in securing cooperation. The time and procedures necessary to obtain films limited us in the total volume of films used.

The contract with the USOE permitted us to pay only print cost for any film the Project used. In a few cases, we lost permission to use films because we could not pay the list price for the material.

4. Personnel for the examination of films, who soon became known by the term "excerpters," were assumed to be available for the Project. The original proposal suggested that these people might be public school teachers, used for three-month periods during the summer, and that the resulting suggestions be reviewed by a panel of subject matter specialists from university departments.

This strategy could not be followed. The first summer of the contract, 1964, we were unable to locate teachers who were interested in this assignment. The associate director and the Project chairman decided to use a group of teachers on campus for a chemistry institute as an experimental group. The Science and Mathematics Teaching Center granted permission to use this group, and a pilot study was carried out. A description of this study, written by Dr. Robert Brandou, Assistant Director of the CHEM Study Summer Institute, is given in the latter part of this chapter. Also, it was difficult to obtain time from professors to examine the recommendations of the teachers.

It was decided to change the strategy and to secure fewer excerpters who might give us half of their time for the duration of the project. Doctoral students in a subject matter area, with some teaching experience, were sought. Six of these students worked on the project: two each in science, social science, and foreign language.

The change in strategy seemed to work well in the interests of the Project. Most of the information in this section of the report is a result of the experiences of these six people who spent from six to eighteen months examining films and making decisions on suitable excerpts.

Excerpting Procedures

Film Selection

From catalogs of those film producers who had agreed to provide suitable materials for examination, the film excerpters selected titles that appeared promising, as far as the subject matter is concerned. These films were requested from the producer on a preview or pre-study basis. The film was then previewed by the appropriate excerpter, and a decision was made for its appropriateness for excerpting. Many films were not accepted or purchased because the excerpters felt that the films were not appropriate for our purposes. Some of the criteria for this decision follows:

1. The date of the original film. In many cases we were unable to determine from the descriptive material when the film had been produced. We found many films that were badly out of date; these were returned to the producer.
2. Film organization. Sometimes the film was poorly organized and "disjointed." In this case, when the film itself did not seem to be very well organized,

it was returned to the producer.

3. The length of films. We found that some films were already single concept films in that they contained only one single idea or one basic theme. If the film was so short that already it was in the format that we were envisioning, the film was returned to the producer.
4. Lecturers on film. Many films are merely a visualized lecture or dialogue between people and groups, or between two different people. If the film was only a dialogue or lecture, the film was returned to the producer.
5. Visual versus audio. The visual sequences were sometimes secondary to the audio track. In these cases, in view of the fact that in the present state of the art, the single concept idea is on a silent format, the film was returned to the producer — for without strong visual sequences there wasn't much we could do with it.
6. Correlation between the picture and the narrative pattern. In some films, the narration was not telling the same story as the visual pattern. This is similar to Number 2 in some respects; but when there was not a close correlation between visual and audio portions of the film, the film was returned to the producer.

Films that were purchased were treated by the six stages following:

Stage One: Purchase and preview

1. When a film was purchased, the project librarian accessioned it. Careful records were kept; because once a film was excerpted, it was necessary to be able to identify each segment.
    a. An accession number was assigned to each film as it was received.
    b. The accession number was placed on the original film can.
    c. The film name and producer was entered in the accession book.
    d. A 5 x 8 alphabetical film card was prepared for the film by accession number.
    e. A 5 x 8 numerical file card was prepared for the film by accession number.
    f. The film was then ready for excerpting.
2. The next step in the process was to preview the entire film, listening to the sound track. The excerpters then made the first analysis for possible clips, using the following clues:
    a. Obvious divisions in the film:
        1. Fades

        2. Going to black
        3. Inserted questions
        4. Outline elements
    b. Sub-topics within the film.

3. The excerpter decide on the tentative footage numbers and a brief descriptive title for the tentative clips.
4. Marks were placed on the film with a grease pencil to identify the clip for the film editor.
5. The information above was then placed on the film cards in the numerical card file. The following items were identified:
    a. Film zero
    b. Footage numbers for each clip
    c. Clip titles
    d. The initial determination of grade level designation
    e. Additional instructions for the film editor

Stage Two: Cutting by the Film Editor

After the initial steps by the excerpter, the excerpt was then physically removed from the original film following the directions of the excerpter. After removing the excerpt from the full film, the short segment was placed on a plastic reel with a cover for storage. This excerpt was also identified by an accession number.

Stage Three: Second Preview by Excerpter

1. The excerpters then reviewed each clip, both silent and with sound, on the Moviola library reader. Another important decision point was reached: the final decision was made as to whether or not the clip was usable for instruction. This second preview was an extremely important step, because the excerpters often found that when the clips were seen out of context, an entirely different thought was transmitted by the filmed segment than when the clips were seen initially within the context of the total film. If the clip was rejected, an appropriate entry was made on the card in the numerical file. If the clip was accepted at this point, additional procedures for refining the clip were followed.
2. Sometimes it was necessary to change the excerpt by adding or deleting footage or by combining two or more excerpts. The primary criterian for this decision was whether or not the filmed sequences presented one complete thought. Occasionally, it was necessary to combine excerpts to present a meaningful

clip. Much thought and training were given to these procedures since the talents of a film editor are used for these decisions, and the teacher-excerpter needed to learn some of the procedures for editing and re-editing film. In many respects, extracting film clips from existing footage is a process of re-editing; and the excerpters became rather skilled at editing film by following these procedures.

3. A decision on sound was necessary at this point.
    a. If the election was made that sound was not necessary, the next step in the procedures was followed.
    b. If the decision was made that the clip was usable without a sound track, three methods for producing the sound track were possible:
        1. Use the original sound track as it appeared on the original film.
        2. Use a slight revision or re-edited version of the original sound track.
        3. Write a script for a completely new sound track.
4. If the decision had been made that a clip should be used without sound, the excerpters almost always had to provide

additional visual material which clarified certain segments of the clip. The additions--inserts, supers, or titles--would be placed on a "B" roll if the clip were actually put into production.

a. Inserts were often used to explain a portion of the visual material or to act as a transition from one filmed segment to the next.

b. Superimpositions were used to draw attention to a single part of a picture, to label a process or piece of equipment, or to indicate time, etc.

c. It was sometimes determined at this point that too many additions had to be made to the film if it were to be used without sound, and it was necessary to use a sound track.

5. After this intense study of each film clip, it was often necessary to rewrite the title, usually in more concise terms than had originally been done on the first persual of the film.

Stage Four: Preparation of the Treatment Sheet

The treatment sheet was the core of the report and the study. These one-page write-ups on the film clips and their use are the information provided to the film producer and to others interested in the Film Clip Project. The appendix of this report carries a copy of each treatment sheet for each film clip identified on the project. This sheet reflects the information remaining after all the decisions have been made about the use of the film. An outline of the information on the treatment sheet follows.

A. Copy information from numerical film card
    1. Title of clip
    2. Clip number
    3. Film producer
    4. Film ID number
    5. Level and use
    6. "Original" footage
    7. Color option
    8. Sound option
    9. Film zero
    10. Clip zero
    11. Additions for "B" roll

B. Write summary
    1. Underline primary key words
    2. Prepare list of secondary terms

An analysis of the treatment sheets done through IBM cards gives us information concerning the relative comparisons between films, clips, people, etc. A section of this report is devoted to the analysis of the treatment sheets.

Stage Five: Duplication of Treatment Sheets

The treatment sheet was then typed on a stencil, and fifty copies were duplicated and filed.

Stage Six: Disposition of Treatment Sheets

A. Copy placed in Master Treatment Sheet file

B. Copy given to previewer

C. Copy given to librarian

D. Copy sent to producer

E. Remaining copies placed on file

Summary Paragraph

The important thing to note in the preceding description and outline is that it is a process of decisions about information in films; and how it is to be used. The analysis of these decisions is one of the major products of this project.

ANALYSIS OF EXCERPTS

The following information is a summary of data and information obtained from Single Concept Film Clip Project data submitted at the Computer Center, Michigan State University in May, 1966.

The total number of film clips considered in the final run-off of data in the computer was 807*. There is a treatment sheet representing each clip in the total number. This total number did not represent all of the film clips retrieved by the excerpters. There were 446 clips that were cut, but which were considered unsatisfactory or unusable after due analysis; thus,treatment sheets were not written for them.

Film clips were excerpted from 16mm films provided by 12 film producers. (The thirteenth producer provided Foreign Language films exclusively.)

In computing the average length of film clips, the total number of both Science and Social Studies film clips was included. It was found that Social Studies film clips were generally longer than Science film clips. The validity of this finding may be questioned due to the diversity in the number of clips cut by each of the four excerpters which can be noted in table #3. For purposes of this summary, the two Science excerpters will be #1 and #2, while the two Social Studies excerpters will be #3 and #4. The order of the number designating each individual excerpter will remain constant throughout this report.

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* No Foreign Language excerpts are included in this analysis. Foreign Language clips were not plentiful enough for a meaningful analysis.

Table 1.

Average Length of Excerpts by Subject Area

	Mean Length	No. of Clips
Total	102 Ft.	807
Science	97 Ft.	553
Social Studies	108 Ft.	254

Table 2.

Average Lengths of Clips Retrieved by Each Excerpter

	Mean Length	No. of Clips
Excerpter #1	101 Ft.	207
Excerpter #2	95 Ft.	344
Excerpter #3	108 Ft.	121
Excerpter #4	135 Ft.	135

A summary of average lengths of film clips organized by producer is found in Table 3.

Table 3.

Average Length of Clip by Producer

	Mean Length	No. of Clips
Producer #1	108 Ft.	12
Producer #2	105 Ft.	34
Producer #3	103 Ft.	7
Producer #4	144 Ft.	8
Producer #5	114 Ft.	82
Producer #6	104 Ft.	321
Producer #7	105 Ft.	12
Producer #8	108 Ft.	41
Producer #9	103 Ft.	31
Producer #10	81 Ft.	144
Producer #11	100 Ft.	54
Producer #12	95 Ft.	61

Each film was divided into five segments to discover the percentage of film clips retrieved from each 1/5 division in the "total number" of films. The first 1/5 and the last 1/5 divisions included a slightly smaller percentage of excerpted footage as compared to the footage located in each of the three middle fifths.

Table 4.

Location of Clips in Original Films

	Total	Science	Social Studies
I	16 %	14.5%	20%
II	20.5%	20 %	22%
III	23 %	23.5%	22%
IV	21.5%	23 %	18%
V	19 %	19 %	18%

A more detailed analysis was made of the percentage of film clips from each 1/5 segment in films from each producer. Table 5 gives these percentages.

Table 5.

Location of Clips in Original Films - By Producer

	I	II	III	IV	V
Producer #1	8	25	25	17	25
Producer #2	23.5	23.5	26.5	17.5	9
Producer #3	16.7	16.7	33.3	16.7	16.7
Producer #4	12.5	25	25	12.5	25
Producer #5	14.5	20	22	23.5	20
Producer #6	11.5	17	23.5	23	25
Producer #7	33.5	11	33.5	22	0
Producer #8	30	20	27.5	15	7.5
Producer #9	15.5	25	18.5	21.5	18.5
Producer #10	18	23	20.5	20.5	18
Producer #11	19	20	24	26	11
Producer #12	13	22.5	23	21.5	18

Upon analysis of the previous mentioned data, a disparity was discovered between percentages of clips from each segment in films cut by each excerpter. Evidence shows that a larger percentage of film clips are retrieved from the first 1/5 of Social Studies films than Science films, indicating a possible difference in format in production design of the two types of films.

Data in table 6 gives percentages of clips from each segment in films cut by each excerpter.

Table 6.

Location of Clips in Original Films - By Excerpter

	Excerpter #1	Excerpter #2	Excerpter #3	Excerpter #4
I	12.5	15.5	22.5	18
II	18	21	21.5	23
III	27.5	21.5	18	25.5
IV	27	21.5	19	17.5
V	17	21	13	16

Two separate designations were used to indicate color preference for film clips --"color necessary" or "color not necessary." In general, 75.5% of the excerpts were "color necessary." The computer analysis gave data on the percentage of the total number of film clips from black and white or color films which yielded "color necessary" or "color not necessary" designations. It also gave data on the percentage of film clips designated "color necessary" or "color not necessary" coming from color films. An analysis of the data in table 7 indicates the degree to which color affected individual excerpters.

Table 7.

Necessity of Color for Clips

	Percentage of Clips Designated "Color Necessary"	Percentage of Clips which were in Color
Excerpter #1	79.5%	91.6%
Excerpter #2	68.7%	77.0%
Excerpter #3	74.8%	85.7%
Excerpter #4	75.6%	86.7%

Three sound categories were most consistently designated for film clips---"sound necessary," "sound desirable," or "sound not necessary." The data in table 8 indicates a considerable difference in "sound necessary" designations between individual excerpters. The "sound desirable" designation indicates a large range of difference between one excerpter and the other three. This can be attributed to differences in interpretation of criteria established for the sound decisions.

Table 8.

Designations According to Individual Excerpters

	Sound Necessary	Sound Desirable	Sound not Necessary
Excerpter #1	52.5%	4.5%	43.0%
Excerpter #2	56.6%	2.6%	40.8%
Excerpter #3	41.2%	41.2%	17.7%
Excerpter #4	67.4%	7.4%	25.2%
Average	54.3%	9.9%	35.8%

There is a significant difference in sound designation which can be attributed to individual film producers, as the data in table 9 indicates.

Table 9.

Sound Designations According to Producer

	"Necessary"	"Desirable"	"Not Necessary"	# of Clips
Producer #1	66.7	0	33.3	12
Producer #2	52.9	41.2	5.9	34
Producer #3	66.7	0	33.3	7
Producer #4	62.5	37.5	0	8
Producer #5	79.5	4.8	15.7	82
Producer #6	59.0	11.5	29.5	321
Producer #7	55.6	11.1	33.3	12
Producer #8	57.5	2.5	40.0	41
Producer #9	56.3	31.2	12.5	31
Producer #10	25.3	2.7	72.0	144
Producer #11	77.8	1.9	20.4	54
Producer #12	36.0	9.8	54.1	61

Primary or secondary terms were used in the summaries to indicate key words in the film clip. A primary term was a term used in the sound track of the film and written in the summary. A secondary term was (1) a term used in the sound track but not used in the summary, or (2) a commonly used synonym important to the content of the film, but not used in the film or in the summary, or, (3) a term used as a different part of speech in the summary than would be commonly used.

The computer analysis yielded data on the mean length of summaries per film clip (12.3 lines) as well as per excerpter. It also yielded the average number of primary (8.2) and secondary (0.7) terms per summary.

The average number of primary terms per excerpter was slightly higher for Social Studies than for Science, but this could be the result of individual differences, since only four excerpters were used.

Table 10 indicates the average length of summaries per film clip by excerpter, and the average number of primary or secondary terms per summary by excerpter.

Table 10.

Average Length of Summary and Number of Key Terms by Excerpter

	Aver. Length of Summary	Aver. No. Primary Terms Per Summary	Aver. No. Secondary Terms Per Summary
Excerpter #1	13.0 lines	8.0	1.0
Excerpter #2	12.4 lines	7.9	.7
Excerpter #3	10.4 lines	8.4	0.0
Excerpter #4	12.1 lines	8.8	0.8

The treatment sheets contain information regarding the editing of the clips for final treatment by film producers. Supers and inserts are designated for this purpose. Supers are written terms placed on the frames they are intended to describe, while inserts are terms or phrases spliced into the film ahead or behind the frames to which they are related. Over half of the film clips which contained any of the three sound designations---"sound necessary," "sound desirable," or "sound not necessary" contained no supers. "Sound desirable" was used by some excerpters to indicate that sound was preferred, but if silent treatment was desired by the producers, supers were indicated for that use.

There is a strong relationship between the average percentage of supers or inserts per clip and clips with the sound "not necessary" designation. There is also a strong relationship between the percentage of clips with no inserts or supers and the "sound necessary" designation.

Tables 11 and 12 indicates the existence or non-existence (in %) of supers or inserts in film clips with the three various sound designations. In general, there were 2.3 supers and 0.7 inserts indicated per excerpt.

Table 11.

Percentage of Clips with NO New Supers or Inserts

Excerpter Recommendation	NO Super Called For	NO Insert Called For
Sound "Necessary"	98.2%	99.8%
Sound "Desirable"	66.7%	92.6%
Sound "Not Necessary"	11.2%	41.7%
Average	64.0%	78.3%

Table 12.

Percentage of Clips With New Supers or Inserts

Excerpter Recommendation	New Super Called For	New Insert Called For
Sound "Necessary"	0.1%	0.002%
Sound "Desirable"	2.3%	0.3 %
Sound "Not Necessary"	5.7%	1.8 %

Table 13 indicates the relationship between the four excerpters and their decisions on the use of supers and inserts.

Table 13.

The Excerpters and Their Treatment of Supers and Inserts

	Average No. of Supers Per Clip	Average No. of Inserts Per Clip
Excerpter #1	2.9	0.8
Excerpter #2	1.7	1.3
Excerpter #3	2.5	0.03
Excerpter #4	1.5	0.01

Various levels were identified on the treatment sheets to indicate approximate grade groupings for utilization of the film clips. The levels in table 14 are coded as follows:

P. - primary - early elementary grades
i. - intermediate - middle elementary grades
j. - junior high - grades 7-9
s. - senior high - grades 10-12
c. - college - undergraduate and graduate courses
a. - adult - any adult education

Only a minimal number of clips were classified for the primary level. This probably resulted from the fact that only a small percentage of primary films were ordered for excerpting.

Table 14.

The Percentage of Clips Designated for Each Level

p	.1%
p,i	1.4%
p,i,j	5.8%
p,i,j,s	2.2%
p,i,j,s,c	.1%
p,i,j,s,c,a	3.0%
i,j	5.8%
i,j,s	18.4%
i,j,s,c	5.3%
i,j,s,c,a	7.2%
j,s	4.0%
j,s,c	13.3%
j,s,c,a	17.7%
s,c	.7%
s,c,a	14.0%
All others	0%

FILM EDITORS REPORT

I. Standard Editing Procedures were followed by the Project editor. A summary of the editor's report follows:

A. Hardware: Editing table, rewinds, splicer, viewer, synchronizer, leader, scissors, feltmarker, reels and cans, thin masking tape.

B. Procedure:

The following steps evolved during the Project as the most practical in the initial cutting:

1) The cutter receives an initial preview card from the previewers, which informs him of the tentative clips which the previewer wants to remove from the film.

2) The cutter takes the film and places it on the left rewind. As he unwinds it, he will place the Zero mark* at 0 into the synchronizer, set it for 0 and wind the film onto a takeup reel on his right rewind.

3) The cutter can now roll down to the beginning of the first desired clip by referring to the footage numbers on his initial preview card and those on the synchronizer. (This could actually be a one-gang counter.)

4) Keeping the film in the synchronizer, the cutter

can now attach a 6 foot piece of leader at the point marked by the previewer, after cutting the film between the synchronizer and the right rewind. This leader will be identified as head-leader for the first clip with the marking pen. (If it is the first clip of the film 444-3-I, at the end of the leader which is closest to the rewind).

5) Attaching the headleader of clip I with tape to the film on the right rewind, the cutter can now reel down to the footage indicated as the end of the clip. He then attaches a 6 foot leader at the marked point, to the right of the synchronizer, and labels it as the tail leader, clip I, film number.

6) This process continues until all clips on this film have received a head and tail leader, are properly identified and are all taped together on the right rewind reel.

7) In reversing, and going right to left now, the cutter can spool off each clip onto a small reel, letting the remainder of the unused footage of the film accumulate on the large reel

(original) of the left rewind.

8) The cutter will then initial the preview card, file it in its proper place; put the clips into their plastic reel sleeves, mark them and file them and the original film (the left over part) in the designated areas.

II. Changes on initial clips

After the clips have been previewed again by the excerpters, there might be some changes desired in the clip. Sections might have to be added, deleted, shortened, switched, etc. In any case, the cutter will receive a detailed description of desired changes with accurate footage numbers--these will however now refer to the clip itself, zero being the first frame of picture of the clip.

It is advisable and often necessary in these cases to first mark all changes with crayon on the clip before making the actual changes.

*Zero is usually the Picture Start Frame (#12) of the Academy Leader; if this is not available it could be the Head Sync Mark (Edit Sync, Printer Sync), or any other mark or number on the Academy leader, as long as it will also be present on the printing master or original. Sometimes a hole may have to be punched at the beginning of the film which is a certain distance away from the first definite change occuring in the film, such as the first straight cut. For all films about to be cut, there should be a reference on the initial preview card as to what the zero is for that particular film.

III. Reduction of Clips

An attempt was made to prepare 11 films as demonstration material. Reduction for 6 of them to a smaller format was done. The editor was involved in preparing the titles, supers and inserts that were deemed necessary for these films by the previewers. The final decision as to placement, length, etc, was left to him. Since we were only interested in the most economical method of producing these clips, it was decided to proceed under the same system as had evolved earlier. At that time, we had found that making a small paper overlay to place over the screen of the Moviola Library Reader was useful to the previewers. Supers could be easily placed in the most advantageous area of the frames. By redoing these overlays on a one to one basis with press type on cells and then photographing these, a surprising amount of accuracy in placement was achieved in the final combination A/B roll print. Using this method, however, one must make certain that the frame in the Reader is cut off equally at top and bottom, otherwise placement could be considerably off. On our A rolls, we kept only the "original" clip, the B roll contained supers, titles, and inserts. Needless to say, the quality of our end product was always marred by the fact that we used as our original, release prints which were themselves probably third generation.

As mentioned before, the results of this method of production are extremely encouraging. As long as letters are kept fairly large in the titles, inserts, and supers, and as long as nothing is placed into probable cutoff areas due to format change, there seems to be no reason, inso far as this editor is concerned, to employ a more accurate (difficult, expensive) method than the one used.

IV. Observations of the Editor

As mentioned previously, there is in an ordinary teaching film which is not vital to its information transmission function. If one is concerned with bits of information, topics, or single concepts, then it seems possible to isolate these from the usually long teaching film without great damage to any one of the subparts. Some may hold that this may be true for the subparts, but that the total is greater than the sum of the parts. As a film maker and editor of film clips, I look with delight upon this new film clip development. I look forward to the time when the teaching film will no longer have to serve as a chain for "bits," or overloaded string of beads. Let the longer film (with its different and more HI FI mode of presentation) return to its origins and fulfill its more artistic and cinematic function. If someone should feel that in clipping a teaching film something really important has gotten lost, then tell us, the film makers, exactly what it is and we will be delighted to make an effective piece of cinema about this missing concept.

It seems, in this editor's experience, that the majority of teaching films from which clips have been pulled have actually been preplanned for clipping. The clips seem to be about 3 min. continuous sections of film, very often with convenient pauses built in between them, such as dissolves, fades, pauses, etc. This might even make the future use of sound a fairly simple operation. Furthermore, it seems that in a production setup it might not even be necessary to actually chop up a print, one could just as easily work with footage numbers right down to the final printing master process. With simple additions like supers, titles and inserts on a B roll, the whole process merely seems to require an additional run when using standard replacement footage procedures. From these printing masters, many hundreds of clips could be pulled before another master would have to be struck. This seems to be entirely within economic possibilities. If extensive editing needs to be done, then it seems to be a rather unfeasible proposition. With more complicated editing (like considering a film just raw footage) previewing time goes up, editing time goes way up, production becomes more complicated, sound is virtually out except for similarly complicated re-recording and editing procedures. The final product itself might not be worth the effort thus expended, since, aside from economics, there is no doubt that a clip produced from scratch will be far superior to any retrieved clip.

Since the design of a film must be dependent on the ultimate use, it follows that a clip produced with the purpose of a clip in mind will utilize more close ups, for example, than the standard 16mm teaching film would ever dare. Also, the pacing might be different, and considering the options of freeze framing and (repeatability), the information-bit density could easily be pushed beyond what the current 16mm medium could tolerate. Questions like these will hopefully be explored before large scale production of clips occurs. Until then, however, and due to the fact that teaching films seem indeed to be constructed in segments which are fairly easily retrievable, clip production seems a very reasonable and economic proposition.

TIME STUDY

Because all film editing is a function of time and effort, the following supplementary report is included because of its possible interest to film producers:

The Project staff decided that it would be advantageous to the Project and to the cooperating film procedures if a time study on excerpting procedures was done. Realizing that this study could not be carefully controlled because of the selection methods for our present film collection, the staff decided to use a random sample for one series of films. The series selected were the EBF Biology Series, which contains approximately fifty films. A random sample of twelve films was selected using a table of random numbers. Two of the twelve were later rejected, because one had already been cut and the other was not excerptable. The remaining ten films were randomly assigned to two excerpters, Mrs. Ardith Hanna and Mr. Lloyd Trinklein. Using stopwatches to keep accurate records of the time, the excerpters followed the procedures for excerpting which are outlined elsewhere in this report.

Film editors also followed their usual procedures, which are outlined elsewhere in this report, and also kept accurate time records using stopwatches.

The summary of the suggestions of the excerpters and film editors follows.

Within the limitations that our film collection and our excerpting procedures place on the study, certain generalizations can be made from the time study. With the type of films used in the study and with the average length of approximately 550 feet, it is possible to excerpt about four clips per film. This is fairly comparable to the other data which was collected on our total film clip collection, reported in other portions of this report.

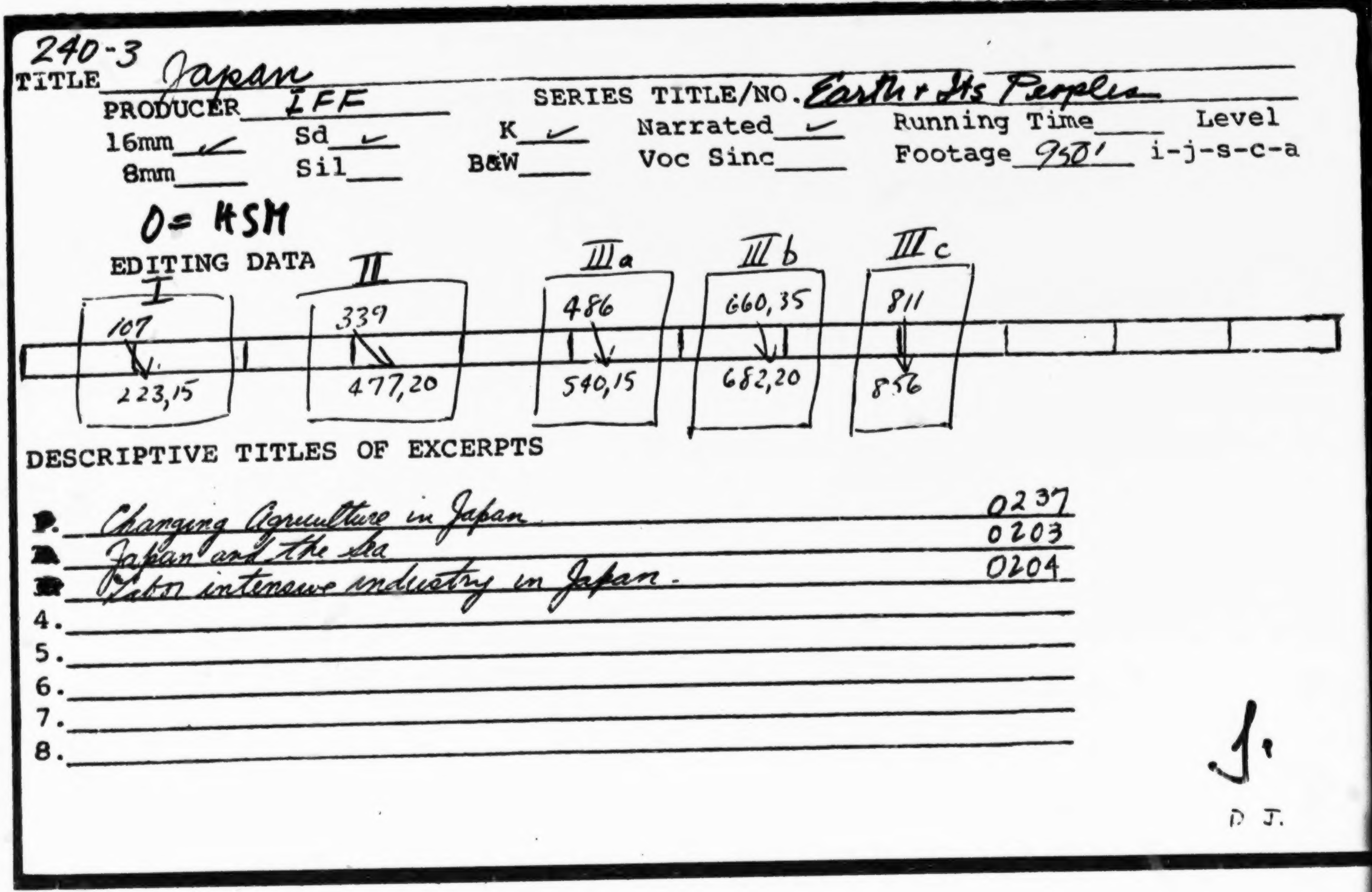
Using experienced excerpters, only about one-fifth to one-fourth of the time necessary for the total treatment of an excerpt is necessary for the initial preview of a film and the selection of appropriate clips. The time required for preview and clip selection averaged twelve minutes and the total treatment on any clip required a little less than one hour.

There was no difference found in the time required to write a summary for a silent clip over a sound clip. Likewise, there was only a six minute difference between the total treatment time for a silent or sound clip. This is to be expected, since a silent treatment is attempted for each clip; this time would also be reflected in the total treatment time of a sound clip.

One disparity appears in the data collected on the time study. Although the analysis of data from all the treatments prepared by the Project revealed that approximately 50% of the clips could be used without sound, our limited study showed that only 17% could be used silent. This can be explained as a result of the particular films which were used in the time study. The EBF Biology series is very heavily packed with subject matter. Thus, after the series was excerpted, it was obvious that the series itself was not a typical sample of the real population of films.

Although the time study was of a limited scale, the Project staff suggests that the data collected might be useful.

EDITING CARD



240-3

TITLE Japan

PRODUCER IFF SERIES TITLE/NO. Earth + Its Peoples

16mm ✓ Sd ✓ K ✓ Narrated ✓ Running Time____ Level

8mm____ Sil___ B&W____ Voc Sinc____ Footage 950' i-j-s-c-a

0= KSM

EDITING DATA

I
107
223,15
II
339
477,20
IIIa
486
540,15
IIIb
660,35
682,20
IIIc
811
856

DESCRIPTIVE TITLES OF EXCERPTS

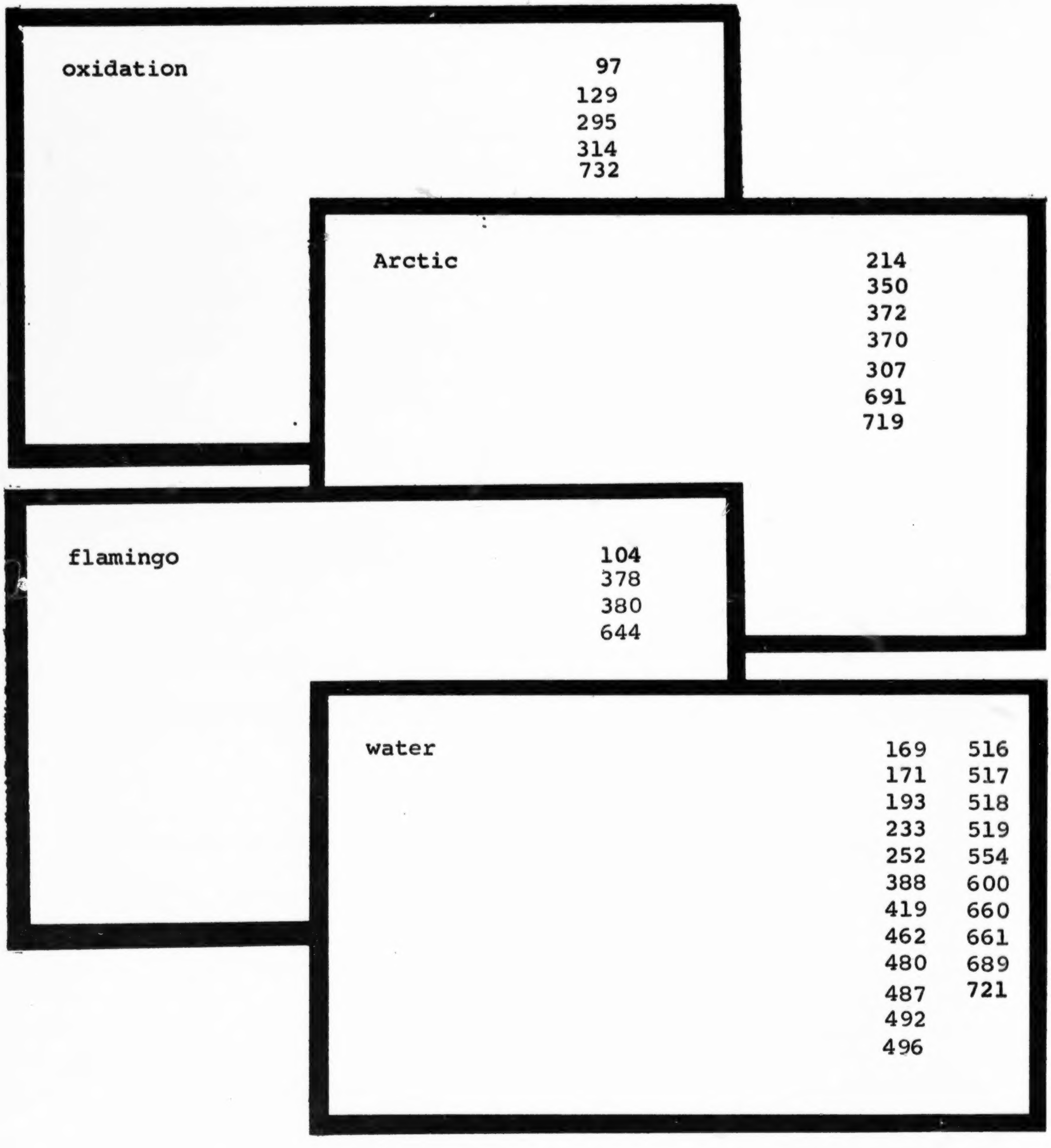
1. Changing Agriculture in Japan 0237
2. Japan and the Sea 0203
3. Labor intensive industry in Japan. 0204
4.____
5.____
6.____
7.____
8.____

J.

D. J.

Sample editing card with excerpter's instructions for cutting by film editor.

CONVENTIONAL INDEX CARDS



oxidation
97
129
295
314
732

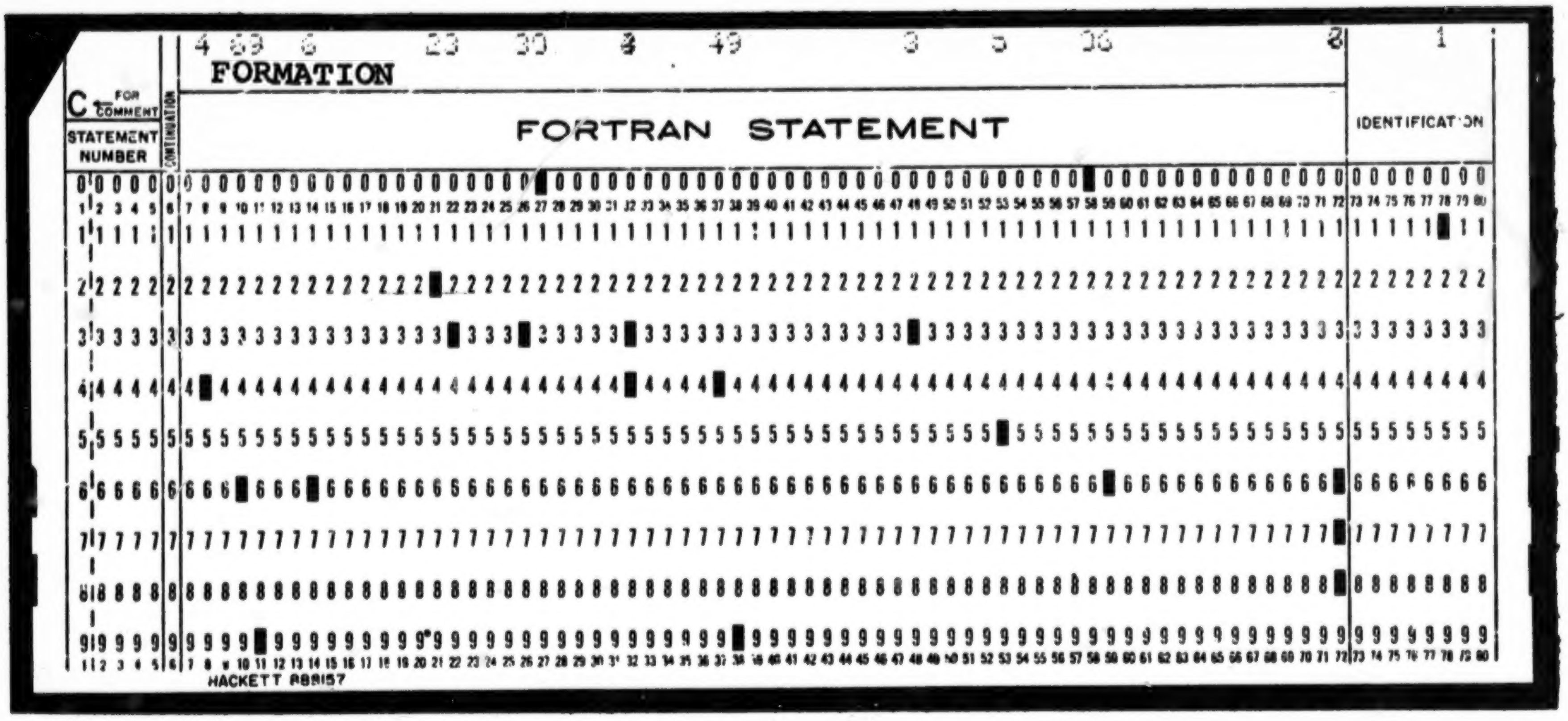
Arctic
214
350
372
370
307
691
719

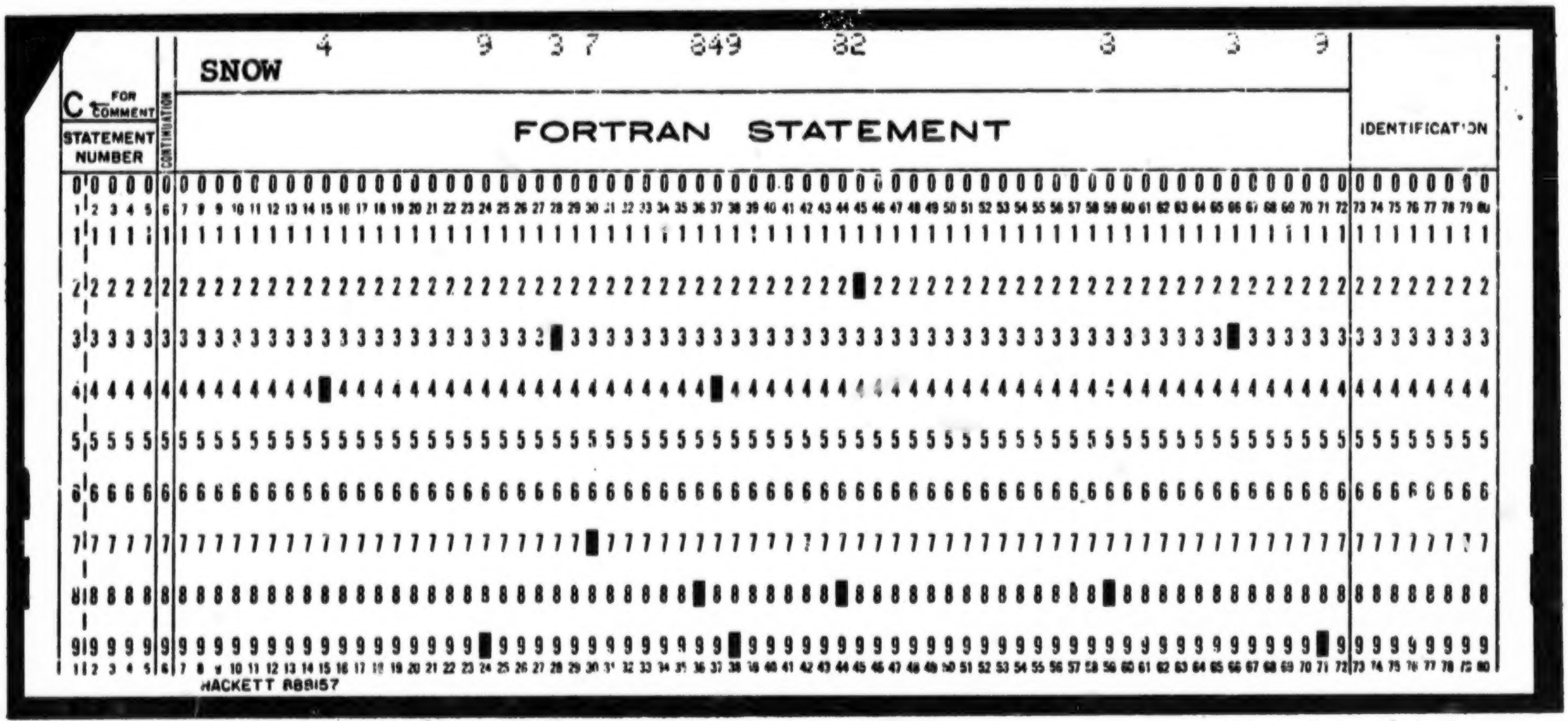
flamingo
104
378
380
644

water
169
171
193
233
252
388
419
462
480
487
492
496
516
517
518
519
554
600
660
661
689
721

Sample key-term cards from conventional index file. Numbers correspond to film excerpts.

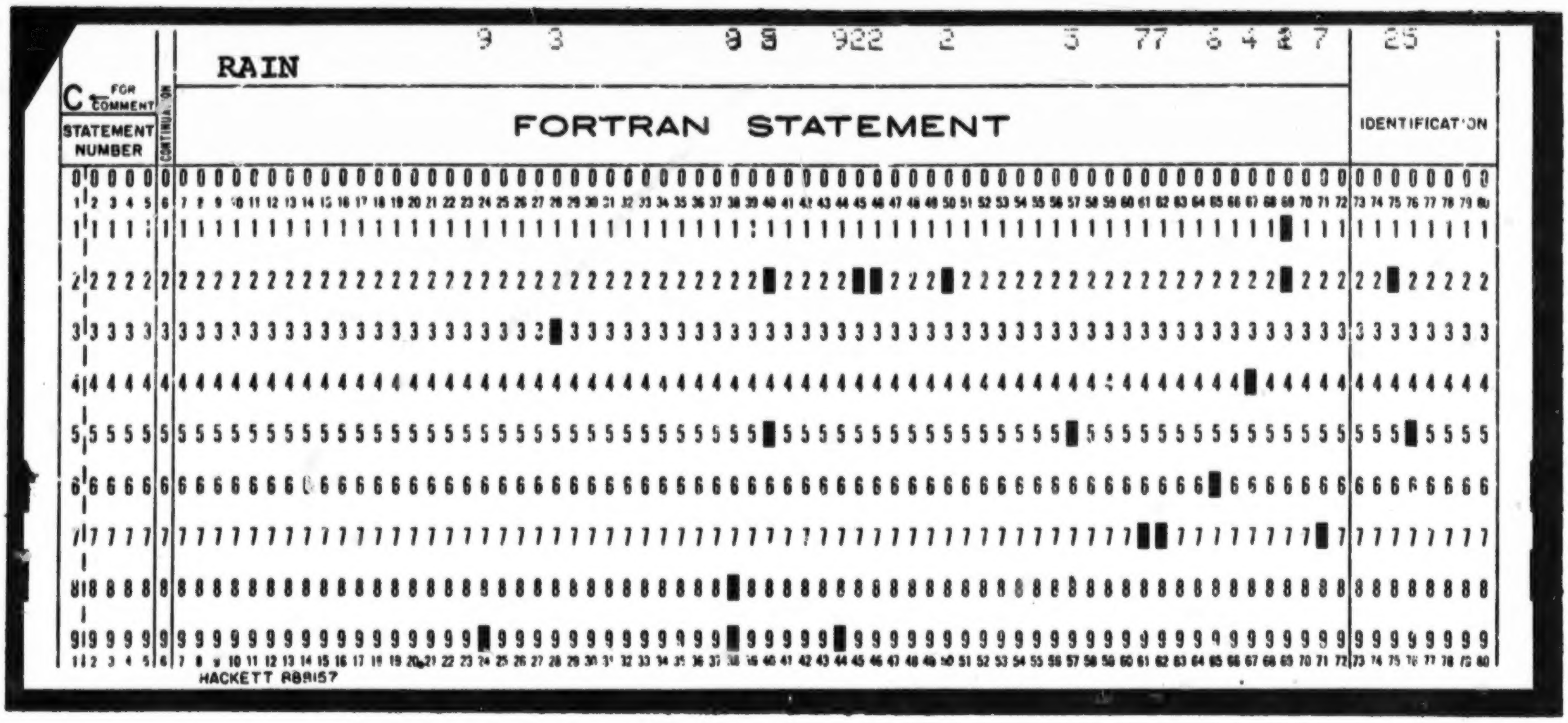
MANUAL COORDINATE-INDEX CARDS


4 69 6 23 30 8 49 3 5 36 8 1
FORMATION
C FOR COMMENT
STATEMENT NUMBER
CONTINUATION
FORTRAN STATEMENT
IDENTIFICATION
HACKETT R88157


4 9 3 7 849 82 3 3 9
SNOW
C FOR COMMENT
STATEMENT NUMBER
CONTINUATION
FORTRAN STATEMENT
IDENTIFICATION
HACKETT R88157

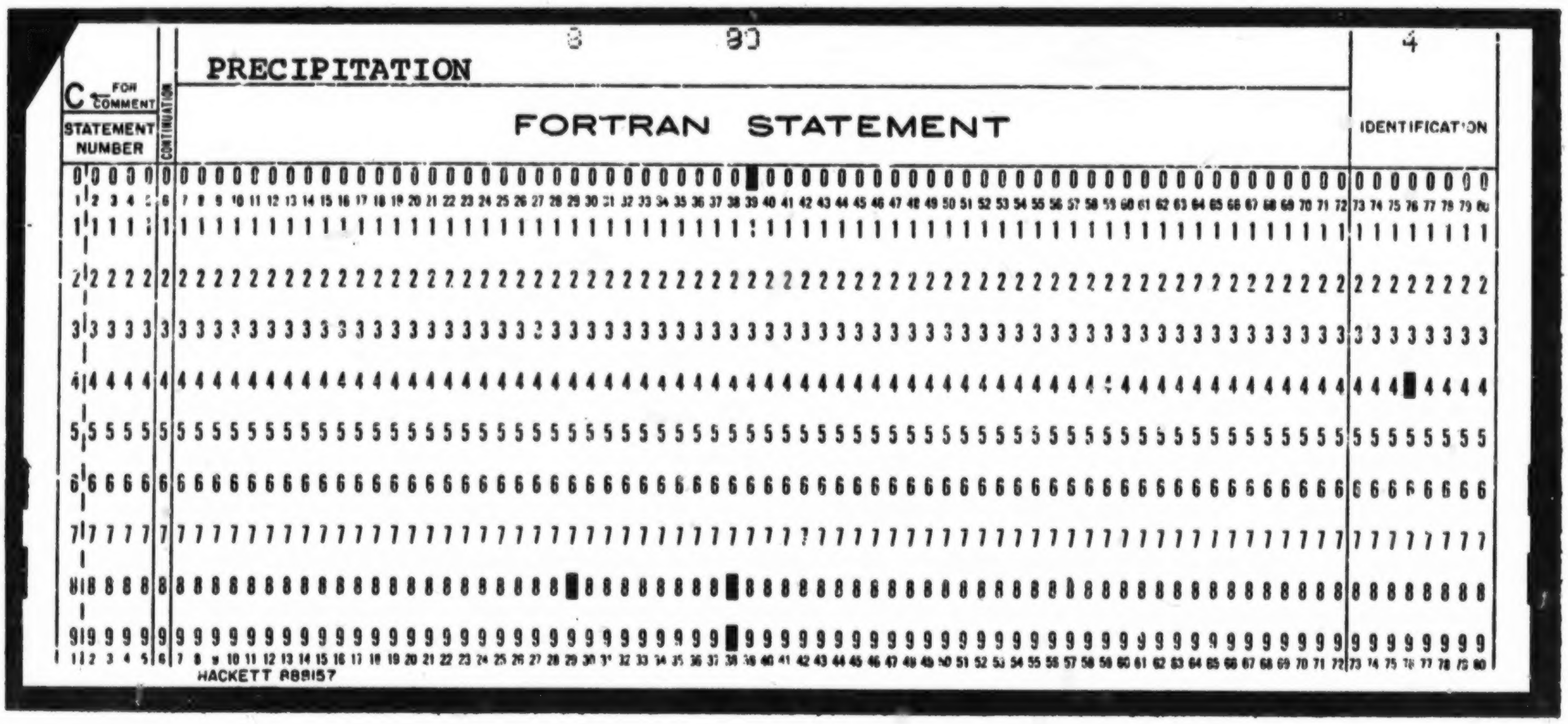
Computer tab cards punched for use as a manual coordinate index file.

The address (number) of each film excerpt related to a term is punched out on the card representing that term.



RAIN

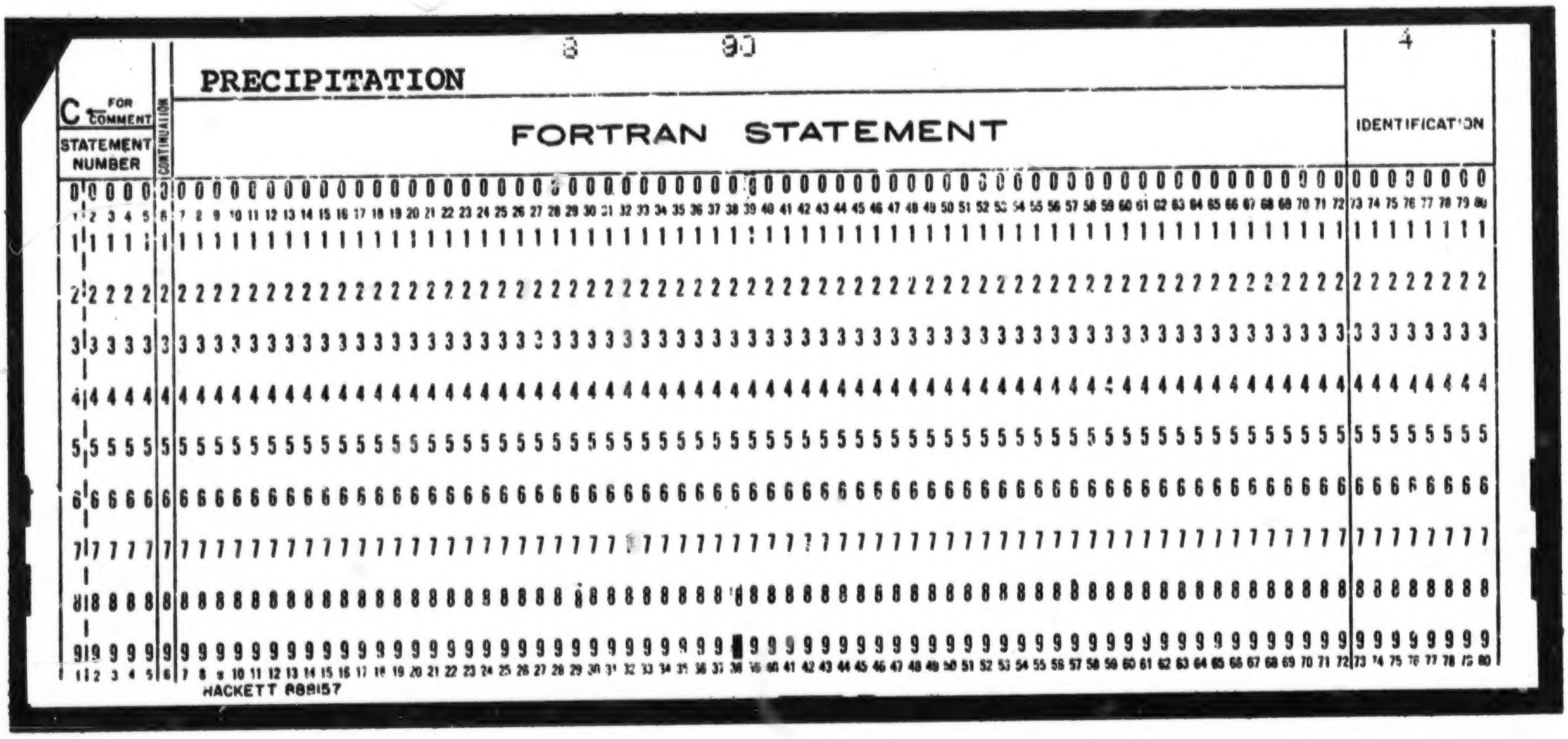
9 3 9 9 922 2 3 77 6 4 2 7 25
C FOR COMMENT
STATEMENT NUMBER
CONTINUATION
FORTRAN STATEMENT
IDENTIFICATION
HACKETT 888157



PRECIPITATION

8 80 4
C FOR COMMENT
STATEMENT NUMBER
CONTINUATION
FORTRAN STATEMENT
IDENTIFICATION
HACKETT 888157

MANUAL COORDINATE-INDEX CARDS


3
90
4
PRECIPITATION
C FOR COMMENT
STATEMENT NUMBER
CONTINUATION
FORTRAN STATEMENT
IDENTIFICATION
HACKETT R88157

Computer tab cards from previous figure in register. Note that the only number common to all (black background showing through) is for #389.

COMPUTERIZED INDEX MATERIALS

Several samples of materials generated by the BIRS Information System are reproduced in Appendix 8.

The samples shown are the most useful types of computer printouts possible with BIRS for the Project's purposes. The system can also provide other kinds of indexes from the same data base.

```
                    ABSTRACT      401, 170 COMPUTER WORDS.

$ CLIP SOME DESERT PLANTS AND ANIMALS                                  040101
$ FILM LIFE IN THE DESERT NORTH AMERICA $ EBF 508                      040102
$ SUMMARY PRICKLY PEAR, DESERT PRIMROSE, INDIAN PAINTBRUSH,            040103
DESERT DANDELION, AND OTHER FLOWERS ADD BEAUTY                         040104
TO THE DESERT.  THE JOSHUA TREE, RELATIVE OF THE LILY,                 040105
HAS ADAPTED TO THE HARSH CLIMATE.  A HUMMINGBIRD DRINKS                040106
NECTAR FROM A BLOSSOM, A GAMBEL QUAIL THRIVES ON SEEDS                 040107
AND INSECTS, AND A HARRIS GROUND SQUIRREL FINDS PLANT                  040108
FOOD.  MOTH LARVAE ARE RAVENOUS HERBIVORES, BUT ARE                    040109
CONTROLLED BY PREDATORS LIKE THE DESERT IGUANA AND THE                 040110
BROWN THRASHER.  A GILA MONSTER SEARCHES FOR EGGS LAID                 040111
ON THE GROUND, AND ITS FAT TAIL INDICATES A PLENTIFUL                  040112
DIET.  ROAD RUNNERS EAT LIZARDS.  NIGHT HAWKS CATCH                    040113
THEIR FOOD ON THE WING.  THE VULTURE LOOKS FOR CARCASSES               040114
LEFT BY THE MEAT EATERS LIKE THE DESERT WILDCAT.                       040115
$ LEVEL P-I-J $ AREA GENERAL SCIENCE                                   040116
$ TIME 2.1 MIN $ COLOR $ SOUND                                         040117
```

COMPUTER GENERATED DESCRIPTIONS

SAMPLE OF COMPUTER PRINTOUT OF FILM EXCERPT DESCRIPTIONS. TOTAL COMPILATION OF ALL SUCH SHEETS MAKES A "BOOK" OF THE DESCRIPTIONS OF THE PROJECT'S FILM EXCERPTS.

THIS "BOOK" IS THE DATA BASE FROM WHICH THE VARIOUS BIRS CONTROL PROGRAMS GENERATE ALL OTHER NECESSARY TAPES AND PRINTOUTS.

```
                    ABSTRACT      402, 230 COMPUTER WORDS.

$ CLIP LIFE IN THE DESERT                                              040201
$ FILM LIFE IN THE DESERT NORTH AMERICA $ EBF 508                      040202
$ SUMMARY THE DESERT TEEMS WITH PLANTS AND ANIMALS WHICH               040203
HAVE ADAPTED TO THE CLIMATE.  ANIMALS (E.G. COLLARED                   040204
LIZARD, LINNETS) MUST HAVE PROTECTION AGAINST THE HEAT,                040205
WIND, CHOKING DUST, SAND, BITTER COLD OF NIGHT, AND                    040206
LONG HOT PERIODS OF DROUGHT.  DESERTS ARE BOUNDED ON                   040207
THE WINDWARD SIDE BY MOUNTAIN RANGES WHICH ACT AS RAINCLOUD            040208
BARRIORS.  STREAMS, THAT FLOW INTO THE DESERT,                         040209
AND WATER HOLES DISAPPEAR THROUGH RAPID EVAPORATION                    040210
AND ABSORPTION INTO THE GROUND.  BARREL CACTI HAVE                     040211
CENTRAL SPONGY CORES WHICH STORE THE INFREQUENT RAIN                   040212
WATER.  THE DESERT TORTOISE HAS WATER STORAGE CAPACITY                 040213
WITHIN ITS SHELL.  LIKE MANY OTHER DESERT ANIMALS, IT                  040214
EXTRACTS WATER FROM FOOD AND STORES THIS IN ITS BODY.                  040215
SOME PLANTS, LIKE THE OCOTILLO, SHED THEIR LEAVES IN DRY               040216
WEATHER TO PREVENT TRANSPIRATION.  MANY ANIMALS (E.G.                  040217
KANGAROO RAT, GREAT HORNED OWL, KIT FOX) MOVE ONLY AT                  040218
NIGHT TO MINIMIZE LOSS OF MOISTURE.  REMNANTS OF CIVILIZATION          040219
AND PLANTS BENEATH DUNES SHOW THE DESERT CAN                           040220
OVERCOME ITS INHABITANTS.                                              040221
```

A

BIRS THESAURUS

```
KEYWORD            ABSTRACT  FIELD DUPS, CONTEXT                                                                PAGE 157

COPPER                031400 SUMMARY      AT THE ANODE. THE ELECTRODE IS COPPER AND THE ELECTROLYTE              031405
                             SUMMARY    2 COPPER IONS.  COPPER IONS, IN TURN, STRIKE THE ELECTRODE.             031408
                             SUMMARY      PICK UP TWO ELECTRONS AND REDUCE TO COPPER METAL.  LITTLE              031409
                             SUMMARY      THE ELECTRODE, SO FEW COPPER IONS FORM.  AT THE CATHODE,               031411
                      047100 SUMMARY      IS USED TO SHOW THE AREAS WHERE GOLD, LEAD, ZINC, COPPER,              047105
                      048500 SUMMARY      GYPSUM, COPPER, ZINC, AND IRON MINES.  BRIEF SECTIONS                 048504
                      055100 SUMMARY      AND COPPER KETTLE ARE USED TO MELT THE TALLOW (FROM SHEEP             055106
                      055900 SUMMARY      AS BORACITE, COAL, LIGNITE, IRON, COPPER, CHROMITE,                   055914
                      057800 SUMMARY      COPPER IN ITS METALLIC FORM.  AT MANY PLACES, HUNDREDS                057825
                             SUMMARY      CUT U-SHAPED MOUNTAIN VALLEYS, AND CARRIED COPPER ORE FOR             057831
                             SUMMARY      SURFACE.  THE LOCATION OF THIS COPPER RULES OUT TRANSPORTATION        057827
                      058000 SUMMARY      COPPER CHUNKS FROM THEIR ORIGIN NEAR LAKE SUPERIOR TO                 058017
                             SUMMARY      COULD HAVE CARRIED THE COPPER PIECES ALONG AND DEPOSITED              058019
                      059800 SUMMARY      $ SUMMARY STRAY PIECES OF COPPER, U-SHAPED MOUNTAIN VALLEYS.          059803
                      066600 SUMMARY      REGION IN THIS REGARD.  COPPER AND CHEMICALS ARE MINED                066618
                      067000 SUMMARY      PICTURED.  AN OPEN PIT COPPER MINE INDICATES ITS MINERAL              067005
COPRA                 066900 SUMMARY      THE COPRA, DRIED COCONUT MEAT, IS USED CHIEFLY FOR ITS                066911
COPRA-DEHYDRATED      057500 SUMMARY      TOGETHER IN MAKING COPRA-DEHYDRATED COCONUT MEAT. THE                 057512
CORALS                079300 SUMMARY      ANIMALS.  ANEMONES, THE STONY CORALS, THE GORGONIANS, THE             079309
CORD                  053000 SUMMARY      WEAVES A STRONG CORD TO ATTACH ITSELF FIRMLY TO A TWIG.               053012
                      061300 SUMMARY      OF THE SPINAL CORD, MEDULLA, MIDBRAIN, THALAMUS,                      061304
                      061400 SUMMARY      $ SUMMARY A SMALL INJURY TO THE SPINAL CORD CAN CAUSE PARTIAL         061403
                             SUMMARY      BUNDLES WITH THE SPINAL CORD ONE SET OF SENSORY NERVES                061411
                      068700 SUMMARY      THREAD ARE GRAPHICALLY SHOWN.  THE CORD,  WHICH IS MADE               068707
                      071200 SUMMARY      CORD MADE FROM COCONUT HUSKS.  A CEREMONY BEGINS WHEREIN              071207
                      072900 SUMMARY      DEVELOPS INTO THE BRAIN AND SPINAL CORD.  THE EMBRYO THEN             072914
                      078400 SUMMARY      INCLUDES THE BRAIN AND SPINAL CORD.  THE PERIPHERAL NERVOUS           078406
                      078500 SUMMARY      DIFFERENT PATHS.  SOME MAY PASS TO THE SPINAL CORD AND                078512
                             SUMMARY      SPINAL CORD AND THEN ON TO THE BRAIN.  THESE IMPULSES ARE             078514
                             SUMMARY      SPINAL CORD TO THE MOTOR NERVES WHICH CONTROL THE MUSCLES             078520
                      078600 SUMMARY      OVER SENSORY NERVES TO THE SPINAL CORD AND THEN DIRECTLY              078610
CORDOBA               035700 SUMMARY      $ SUMMARY CORDOBA IS LOCATED ON A MAP.  THE EARLY SPANISH             035703
                             SUMMARY      TOURISM IN THE SURROUNDING SIERRAS OF CORDOBA IS SHOWN.               035705
CORE                  038900 SUMMARY      WHICH FREEZE ON TO THE FROZEN CORE.  SNOW OCCURS ONLY                 038914
                      077800 SUMMARY      A CIRCLE CORE, A SCREW IS FORMED.  A CAR JACK WITH A                  077809
                      081800 SUMMARY      VERY HEAVY, IRON CORE ABOUT 4000 MILES IN DIAMETER.  AROUND           081808
CORES                 040200 SUMMARY      CEN                                                                    040212
CORK                  002500 SUMMARY      WHIC                                       AVE PATTERN.  CORK002508
CORMORANTS            037700 SUMMARY      FROM                                                                   037707
                      038100 SUMMARY      CORN                                                                   038106
                      040800 SUMMARY      $ SU                                                                   040803
                             SUMMARY      AFTE                                                                   040807
CORN                  005600 SUMMARY      $ SU                                      N PLANTS AND THE             005605
                      015000 SUMMARY      PLAN                                                                   015013
                      024600 SUMMARY      FOR                                                                    024619
                             SUMMARY      PRO                                                                    024611
                             SUMMARY      THE                                                                    024613
                             SUMMARY      WOMEN, AND ONE USE OF THE CORN MEAL IS SHOWN AS BREAD                 024614
                      038500 SUMMARY      AND FILLED CORN PATTIES.                                              038512
                      046800 SUMMARY      CORN AND HOG BELT, THE SOYBEAN BELT, AND THE HAY AND                  046805
                             SUMMARY      HARVEST AND THEN TWO MAJOR USES OF THE CORN ARE SHOWN.                046814
                             SUMMARY      MARKET.  A TRACTOR-DRAWN CORN PICKER SHOWS THE CROP                   046813
                      048700 SUMMARY      AN ACRE OF CORN 3000 TO 4000 GALLONS.  ALL THE WATER THAT             048713
                      050600 SUMMARY      PLANTS.  CERTAIN PLANTS, LIKE CORN, DIE AT THE FIRST                  050604
                      054400 SUMMARY      VILLAGE SCENES AND THE ROUND CORN BREAD CALLED ARREPA,                054419
                      055200 SUMMARY      CORN AS A DAILY FOOD IS ILLUSTRATED.  CULTIVATION OF                  055205
```

SAMPLE THESAURUS OF KEY TERMS GENERATED BY THE COMPUTER FROM DESCRIPTIONS OF FILM EXCERPTS.

COMPUTER QUERY AND ANSWER

```
 SEARCHING   METHOD,
                  METHOD OF CALCULATINE RELEVANCE INDEX =  3 .
                  MINIMUM RELEVANCE INDEX USED FOR RETRIEVAL =  0.600
                  MAXIMUM NUMBER OF ANSWERS REQUESTED = 10

QUESTION TEXT.
             FORMATE ,PRECIPIT,P       ,RAIN    ,SNOW    ,.



                    ABSTRACT NO.  389   WORD COUNT 200   RELEVANCE INDEX  1,000

             $ 0389 $ CLIP FORMS OF PRECIPITATION                                038901
             $ FILM FINDING OUT ABOUT THE WATER CYCLE $ UWF                      038902
             $ SUMMARY ELECTRICAL ACTIVITY IS IMPORTANT IN THE FORMATION         038903
             OF RAINDROPS.  TINY CHARGED PARTICLES OF DUST, SMOKE                038904
             OR SALT ACT AS NUCLEI TO WHICH THOUSANDS OF WATER VAPOR             038905
             MOLECULES CLING, FORMING DROPLETS.  THESE UNITE TO FORM             038906
             DROPS HEAVY ENOUGH TO FALL WITH GRAVITY.  RAIN FORMATION            038907
             MAY TAKE MINUTES OR HOURS.  RAIN IS ONE FORM OF PRECIPITATION       038908
             WHICH RETURNS WATER FROM THE AIR TO EARTH.                          038909
             SLEET IS A MIXTURE OF RAINDROPS AND ICE PELLETS, OR                 038910
             FROZEN RAIN.  HAIL OCCURS ONLY DURING THUNDERSTORMS.                038911
             AIR CURRENTS CARRY WATER DROPLETS UP AND DOWN THROUGH               038912
             THE VERY COLD CLOUD, ADDING SUCCESSIVE LAYERS OF WATER              038913
             WHICH FREEZE ON TO THE FROZEN CORE.  SNOW OCCURS ONLY               038914
             WHEN CONDENSATION TAKES PLACE BELOW FREEZING.  ICE CRYSTALS         038915
             FORM INSTEAD OF WATER DROPLETS, AND MANY UNITE TO                   038916
             FORM A FLAKE.  SNOW FLAKE DESIGNS ALWAYS HAVE SIX SIDES.            038917
             NUCLEUS                                                             038918
             $ LEVEL P-I-J $ AREA GENERAL SCIENCE                                038919
             $ TIME 2,1 MIN $ COLOR $ SOUND                                      038920
```

PRINTOUT SHOWING QUESTION SUBMITTED TO COMPUTER AND ITS ANSWER. THE RELEVANCE INDEX (IN THIS CASE 1.000) IS THE RATIO OF KEY TERMS IN THE QUESTION MATCHED BY A GIVEN ABSTRACT DIVIDED BY THE TOTAL KEY TERMS IN THE QUESTION. THE QUESTION WAS STATED ORIGINALLY: "WHAT IS AVAILABLE FOR THE PRIMARY LEVEL ON THE FORMATION OF RAIN AND SNOW PRECIPITATION?"

THE COMPUTER'S SEARCH CAN BE WIDENED OR NARROWED BY CHANGING THE MINIMUM RELEVANCE INDEX AND BY ADDING OR DELETING KEY TERMS FOR SIMULTANEOUS MATCHING.

COOPERATING FILM PRODUCERS

1. Arthur Barr Productions
2. Bailey Films Inc.
3. Cenco Educational Films
4. Churchill Films
5. Walt Disney
6. Encyclopaedia Britannica Educational Corporation
7. Film Associates of California
8. International Film Foundation
9. McGraw-Hill Text Films
10. Modern Learning Aids
11. Moody Institute of Science
12. United World Films now: Universal Education and Visual Arts
13. Neubacher - Vetter Film Productions

Producers 1-12 correspond with data analyzed in Appendix A-2. Producer 13 provided only Foreign Language Films to the project. The project data on Foreign Language films was insufficient for analysis.

SAMPLE TREATMENT SHEETS

As indicated earlier in the Final Report of the Project, the treatment sheets prepared on each film clip and provided to the film producers, represented the major body of effort by the Project staff. Over 800 of these treatment sheets were prepared and entered into the information system. In the interest of brevity, a sample of a treatment sheet describing an excerpt from a film of each cooperating producer is included in the Appendix. These samples were selected at random.

Clip Title: Corn in Mission Life
SCFCP #382-2-IV

Film Title: Mission Life (revised)
Arthur Barr

Summary: The setting is a Spanish mission in Southern California about the year 1776. The importance of corn as a daily food is illustrated. Cultivation of the hills of corn is shown; the Indians use wooden hoes. Tortilla making is then shown. The dried kernels are removed by rubbing the ears of corn together. These kernels are placed in a brass kettle and cooked in lime water to loosen the skins. The softened kernels are then placed on a stone metate and ground into dough with the stone mano. An iron plate is heated over a charcoal fire. The dough is patted quickly into flat tortillas and placed on the heated plate to cook.

Level and Use: p-i-j; History, Geography

Original Footage: 148 feet (523 to 671 ft.)

Color Option: Necessary

Sound Option: Silent, sound optional

Additions for B roll:

Supers	Foot-Frames
Cultivating corn	1-0 to 4-0
Preparation of Tortillas	5-0 to 7-0
Lime water	46-0 to 48-0
Metate and Mano	72-0 to 74-0

Film Zero: Our zero is 41 feet 36 frames in front of first cut occuring in the film

Clip Zero: First frame of clip

#382-2-IV

Clip Title: How Are Clouds Formed?
SCFCP #394-1-II

Film Title: Clouds Above
Bailey #216

Summary: Clouds are made of tiny droplets of water. These drops come from several sources: the ocean, streams, ponds, trees, and the soil. As air passes over any source of water, it picks up tiny particles of water called water vapor. The process of changing liquid water to water vapor is evaporation. Clouds are formed by water vapor changing into larger drops of water. This process is called condensation. The water cycle then includes: the Sun evaporating water from the Earth, the water vapor condensing into large drops to form clouds, and these clouds then dropping the water back to the Earth in the form of precipitation. Several demonstrations are done to show the processes involved in the water cycle.

Level and Use: i-j-s; General Science, Physical Science

Original Footage: 127 feet (73 to 200 ft.)

Color Option: Necessary

Sound Option: Necessary

Film Zero: Our zero is 22 feet 23 frames in front of first cut occurring in the film

Clip Zero: First frame of clip

#394-1-II

Clip Title: Overview of Levers
SCFCP #438-1½-III

Film Title: The Lever
Cenco #58827

Summary: This film gives a short overview of levers. The lever is one type of simple machine. Three types of levers are formed by rearranging the positions of the effort, the resistance, and the fulcrum. A lever can help us do work by increasing force, speed, or distance. The computation of work is briefly explained, as well as the meaning of mechanical advantage and its computation.

Level and Use: j-s-c-a; General Science, Physics

Original Footage: 74 feet (307 to 381 ft.)

Color Option: Necessary

Sound Option: Necessary

Film Zero: Our zero coincides with the Academy Leader Picture Start frame

Clip Zero: First frame of clip

#438-1½-III

Clip Title: Columbus in the Courts of Europe
SCFCP #264-2-III

Film Title: Christopher Columbus
Churchill #217-B

Summary: Columbus' plan to sail west was presented to the King of Portugal. Two different calculations of the size of the earth are shown. Rejected in Portugal, Columbus journeyed to Spain. His presentation to Ferdinand and Isabella is shown. After an eight year wait in Spain his plan is again presented to the Spanish court. The demands of Columbus are enumerated. Just as he began to leave for France, he was called back to court as the monarchs changed their minds.

Level and Use: p-i-j-s; Geography, History. Could be used in series with other clips from this film.

Original Footage: 128 feet (185 to 220; 234 to 325 ft.)

Color Option: Black and white

Sound Option: Necessary

Film Zero: Our zero coincides with the Academy Leader Picture Start frame

Clip Zero: First frame of clip

#264-2-III

Clip Title: Molecular Movement
SCFCP #171-3-V

Film Title: Our Friend the Atom - Part I
DIS #802A

Summary: Billions of molecules are contained in a single drop of water. Their constant movement is indirectly demonstrated by the Brownian motion of dust particles suspended in water and viewed under a microscope. The motion of atoms and molecules in a flame is extremely violent, causing sensations of heat or pain. Slower moving molecules create little nerve reaction, or register as cold. The size of atoms in a candle flame, exaggerated over a billion times, shows the transfer of energy to glass molecules and then to ice. As the ice molecules move faster, they break loose, or melt, to form liquid. With more rapid movement, the water boils. The molecules of steam move with enough force to lift the jar lid.

Leval and Use: j-s; General Science, Physical Science, Chemistry

Original Footage: 98 feet (547-0 to 645-0)

Color Option: Not necessary

Sound Option: Excellent, not needed. If used silent, needs editing between 9-25 to 16-10.

Additions for B roll:

Supers	Foot-Frames
Billions of molecules	2 -10 to 6-10
Dust particles	17-30 to 20-30
Brownian motion	22-0 to 26-0

Film Zero: 4 feet 38 frames after Academic Leader Picture Start

Clip Zero: First frame of clip

Clip Title: Model of Molecular Motion in Different Phases
SCFCP #18-3-I

Film Title: Introduction To Gas Behavior
EBF #49018

Summary: A demonstration is done to show the difference in molecular motion in the three phases of a substance. Glass beads in a glass enclosed frame are used to represent the molecules. A vibrator is attached to the frame to give the "molecules" the kinetic energy that is necessary to change from solid to liquid to gas. As the vibrator is speeded up the molecules move with additional speed and move farther. Finally the vibrator is slowed down, and the substance returns to solid form.

solid, liquid, gas, vibrator

Level and Use: j-s-c-a; General Science, Physical Science, Chemistry, Physics

Original Footage: 54 feet (510 to 564)

Sound Option: Silent

Color Option: Immaterial

Additions for B roll:

Supers	Foot-Frames
Solid phase	1-0 to 5-0
Liquid phase	7-0 to 11-0
Gaseous phase	18-0 to 31-0
Liquid phase	39-0 to 43-0
Solid phase	46-0 to 49-0

Additional information for the editor:
Cut 34-25 to 36-35 and omit

Film Zero: Our zero coincides with the Academy Leader Picture Start frame

Clip Zero: First frame of clip

Clip Title: What are Asteroids?
SCFCP #389-1-I

Film Title: Asteroids, Comets, and Meteorites
FA #47X

Summary: In 1801 an Italian astronomer named Piazzi watched a strange small object move across the sky, as he watched it night after night. Because it moved, Piazzi thought it must be a small planet. Within a short time, thousands of these objects were discovered by other astronomers. They were called asteroids. Asteroids are solid bodies. Some of them are round, but most of them are irregular. Most of the asteroids are only a mile or so across, but the largest one is about 500 miles in diameter. Most of these objects move around the Sun between the orbits of Mars and Jupiter. The final sequence shows a diagram of the way the planets and asteroids move about the Sun, our solar system.

Level and Use: i-j-s; General Science, Physical Science

Original Footage: 73 feet (36 to 109 ft.)

Color Option: Necessary

Sound Option: Necessary

Film Zero: Our zero coincides with the Head Sync mark

Clip Zero: First frame of clip.

#389-1-I

Clip Title: The Interpretation of Hieroglyphs
SCFCP #242-3-II

Film Title: The Ancient Egyptian
IFF

Summary: Actual hieroglyphs are pictured. Then follows the problem of interpretation of these symbols thru animation. Champoleon's work in interpretation is stressed. Analysis of the cartouche (symbols used for royalty) provided one key and reference to the Rosetta stone is made. It is shown how sounds were associated with the symbols. Word formation thru the use of phonograms using the rebus principle is illustrated. The use of determinatives is explained and shown clearly. The development of the written language is briefly shown.

Level and Use: j-s-c-a; Linguistics

Original Footage: 115 feet (98-20 to 214-0 feet)

Color Option: Color very good - not necessary.

Sound Option: Sound excellent - necessary.

Film Zero: Our zero is 22 feet 37 frames in front of first cut occuring in the film

Clip Zero: First frame of clip

#242-3-II

Clip Title: Industrial Cordoba - City of Argentina
SCFCP #252-2-IV

Film Title: Argentina
McGH #Latin American 402142

Summary: Cordoba is located on a map. The early Spanish settlement and influence is noted. The importance of tourism in the surrounding Sierras of Cordoba is shown. Shots of the modern city are coordinated to indicate its importance as an industrial center. Automotive and farm machinery factories are pictured and their importance to Argentina noted. A progressing material society is indicated by the great increase in motored transportation.

Level and Use: i-j-s; South American Geography, Transportation, Economic Development

Original Footage: 59 feet (388 to 447 ft.)

Color Option: Useful

Sound Option: Sound track good and necessary

Additional information to editor: The first 14 frames may be discarded but the sound track maintained

Film Zero: Our zero coincides with the Academy Leader Picture Start frame

Clip Zero: First frame of clip

#252-2-IV

Clip Title: Common Acid Indicator
SCFCP #190-2-I

Film Title: Acid-Base Indicators
MLA #4130

Summary: Tea, red cabbage juice, and litmus paper are used to show color changes when acids are added to them. Thus the colors are shown to be a factor of their acidity or basicity.

indicators

Level and Use: i-j-s; General Science, Chemistry, Physical Science

Original Footage: 39 feet (13-52 ft.)

Color Option: Necessary

Sound Option: Silent

Additions for B roll:

Supers	Foot-Frames
Tea	1-25 to 4-5
Red cabbage juice	15-20 to 19-5
Litmus paper	24-35 to 26-35

Inserts	
When acids are added to certain substances, there is a color change	Beginning
Tea, red cabbage juice, and litmus papers can be used to indicate acids.	End

Film Zero: First straight cut 9 feet 28 frames from our zero

Clip Zero: First frame of clip

Clip Title: The Electromagnetic Spectrum
SCFCP #163-3-II

Film Title: Sense Perception Part II
MIS #218

Summary: Just as visible light can be resolved into seven basic colors, electromagnetic radiation can be resolved into a spectrum on the basis of wavelength or frequency. The various bands of the spectrum are explained and demonstrated from the longest wavelengths, which are electric, to the shortest, cosmic rays. The electric waves are about 3000 miles long and include the 60 cycle frequency used for power. Radio waves may be as long as those picked up on standard receivers, short-waves, television, or radar. Infra-red waves, heat, are next in length, followed by the small band of visible light ranging from red to violet. Invisible ultra-violet light causes sunburn and can be changed to visible light by some minerals. X-rays have shorter wavelengths, with cosmic rays being the band with shortest wavelengths. If the logarithmic scale of the electromagnetic spectrum were changed to linear, the chart would have to stretch 300,000,000,000 miles to show the visible spectrum in a space one inch wide.

Level and Use: j-s-c-a; Physics, Physical Science, Biology - Physiology, General Science

Original Footage: 198 feet (113-0 to 310-25)

Color Option: Needed

Sound Option: Excellent. Needed

Film Zero: Printer Start. 50 feet 29 frames before first straight cut

Clip Zero: First frame of clip

#163-3-II

Clip Title: Permanent Magnets
SCFCP #373-2-II

Film Title: Story of Magnetism
UWF #NP6

Summary: Compass needles, bar, and horseshoe magnets, and others, are called permanent magnets because they tend to hold their magnetism. Powerful permanent magnets are made from combinations of iron, aluminum, nickel, cobalt, and copper. They are used in many ways: telephone ear pieces, pot holders, can openers, screw drivers, hammer, microphone, electrical measuring devices, removing particles from an eye, toys, and games. Every magnet, including the earth, is surrounded by a magnetic field.

iron, aluminum, nickel, cobalt, copper

Level and Use: i-j; General Science

Original Footage: 54 feet (172-5 to 226-15)

Color Option: Needed

Sound Option: Excellent. Can be used silent

Additions for B roll:

Supers	Foot-Frames
Microphone	31-5 to 32-5
Meters	32-25 to 33-25
Removing particle	35-0 to 37-0
Magnetic fields	46-30 to 48-30

Film Zero: Our zero coincides with Academy Leader Picture Start frame

Clip Zero: First frame of clip

#373-2-II

Clip Title: Viviendas Españolas
SCFCP #360-1

Film Title: Viviendas Españolas (Vistas de espana, #4)
Neubacher

Summary: The film is introduced by a Spanish instructor who shows an apartment floor plan, pointing out the names of the different rooms. Pictures of an actual apartment in Madrid follow with an introduction to the family, which is following a typical daily routine. The father works in his office, the children listen to music, play cards. In the evening the family eats a meal together and afterwards the parents receive an English lesson from a tutor. Besides the apartment several private homes are briefly shown. The film ends showing the "pueblo español" section of Barcelona with its examples of regional home architecture from all sections of Spain.

Level and Use: Junior High, High School, College, Adult

Original Footage: 396 feet

Color Option: Not necessary but adds

Sound Option: Needed

Film Zero: Use entire film

Clip Zero: Use entire film

#360-1

SUMMARY OF ANCILLARY ACTIVITIES

Several additional pilot studies were conducted by Project staff members which were included in the original contract with the USOE. These studies were used to give information to staff members when an important decision on procedures had to be made. Summaries of these four studies follow.

A. Pilot Excerpting Study

The following is a summary of the pilot study that was carried out by Dr. Julian R. Brandou and Project staff members to establish possible excerpting procedures:

The Single Concept Film Project: Phase One
A Pilot Study Based on the CHEM Study Films
by Dr. Julian R. Brandou
Science and Mathematics Teaching Center
Michigan State University

Introduction

This pilot investigation was conducted as one of the initial activities of the Single Concept Film Project. Members of the Science and Mathematics Teaching Center staff were invited to participate in planning this initial phase since it was to involve selected science films. The result of this joint planning was the formulation and implementation of the following study.

One aspect of the project is the selection of useful segments from available films. The films selected were a set of twenty-seven CHEM Study films prepared for that curriculum study and distributed by Modern Learning Aids, Incorporated. Subjects for the study were fifty-six participants from the 1964 CHEM Study Institute which was sponsored by the National Science Foundation and conducted at Michigan State University for teachers of secondary school chemistry.

The Overall Design of the Study

The study covered the six-week period of the CHEM Study Summer Institute. The Institute program included a daily screening of one or more films including the CHEM Study film series. This activity was a regular part of the Institute, and notes were customarily taken by the participants for later reference. The participants were shown a commerical film clip and instructed to consider the possibility of creating such teaching elements by cutting available films. Instruction was also given in regard to the evaluation form which was to be used. The form provided the participants place for their own notes and comments as well as asking for specific information in regard to potential film clips. Carbon copies of each evaluator's report were retained for review by the project staff. The data were entered onto IBM mark-sense cards for tabulation and processing.

The Instruments Used In The Study

The film evaluation form was prepared by Dr. Elwood Miller of the project staff and the author. It consisted of two parts on a single legal size page. The first section dealt with general film characteristics, including space for comments and contained a brief catalog description of the film content. The lower portion of the page was devoted to the items designed to elicit responses regarding film clips. A space was provided for a suggested title, and a scale to locate the clip with the film. An item describing possible uses for the clip was provided. Information regarding additional clip suggestions could be written on the back of the page. Mechanically the forms were convenient for the Institute participant since it was possible for him to retain his original and return the carbon to the staff representative.

Additional information was available on the film series from the CHEM Study program and from the distributors of the films, Modern Learning Aids, Incorporated. Data on the Institute participants were obtained from their applications for participation in a summer institute, NSF form 9C-24B, through the cooperation of the Institute Director, Dr. C. N. McCarty, Professor of Chemistry, Michigan State University.

Questions Examined And Findings Of The Pilot Study

A number of questions related to the films as teaching elements were raised in the evaluation questionnaire and were expected to reveal some comparative data on the film series. Three major points were investigated:

1. Does this film seem suitable for use in the classroom setting as an introduction, for motivation, demonstration, reinforcement, review, or another type of teaching situation?

2. Does the film seem suited for use in the laboratory?

3. How does the scientific accuracy, content, organization, method of presentation, photography, clarity, and technical quality of the film compare with established standards?

A four-point scale was available for each sub-question using the following categories: "does not apply," "poor," "adequate," and "good." Since all counts were made by frequency of selection, no relative scores were developed. A single score for film evaluation was obtained by giving an equal weight to each sub-item in question three and then determining the total frequency of "good" indications.

The major area of interest in this pilot study centered on the selection of useful excerpts from the prepared films. Among the questions raised are the following:

A. How many film clips are there per film? Where are they located? What titles seem appropriate? What purposes could the clips serve?

B. Is there a consistent response pattern for each clip with a title and use for each location cited?

C. Is there a significant relationship between the evaluation scores of the films and the number of film clips noted?

D. Are there discernible differences between the years of teaching experience of those individuals who selected large numbers of clips and those who selected few clips?

E. Are there discernible differences between the chemistry backgrounds, both graduate and undergraduate, of the individuals who selected large numbers of clips and those who selected few clips?

F. Do the selections made by the Institute group correspond on the average with selections made on the same films by experienced film previewers?

The technique used to determine answers for the questions was the construction of scatter diagrams from each pair of measures and the reduction of the diagram to a contingency table. Tables were then examined for independence using the Chi-square method. If independence were rejected, appropriate correlation coefficients were calculated. Single values were ascertained from appropriate tables and charts.

Conclusions And Implications

1. The films prepared for the CHEM Study curriculum were highly rated by the subjects in this study for use in the classroom.

2. A number of segments from these films were cited as potentially useful short format clips by the subjects in the study.

3. More experienced teachers and teachers with more extensive backgrounds in chemistry selected more film locations as potentially useful.

4. The selections of the teachers were reasonably consistent with those made by experienced previewers.

5. The classification of the film clips by titles or uses in the curriculum is not consistent with any of the measure tested.

There appear to be many pieces of film within present educational films that could serve a useful purpose on their own. The problem of selecting such elements does not appear to be difficult. An experienced teacher with a fairly extensive background can pick out a number of such items in a single viewing of a film. Experienced previewers frequently select the same sections, even after several screenings. The retrieval of a clip once it has been produced seems to present the most difficult aspect of the study. Experienced teachers who have seen the film do not describe a given clip by the same name. The description of a given clip must be given great attention so that the clip would be accessible through a number of inputs.

B. Pilot Use Study

A small pilot use study was conducted by project staff members in Detroit in May, 1965.

The purpose of this study was to gather some information and data, both attitudinal and objective, which would serve as pilot information for further study of the use of single concept films.

The sample that was used for study was six Chemistry II classes from Detroit Denby High School. There was 153 individuals involved in all the classes. Three teachers were involved, each of them teaching two classes.

The study was based on the assumption that short excerpts from CHEM Study films would teach more of the material in the films than the recommended use of the film would. Three experimental groups were established, of two classes each, to test this hypothesis.

One of these groups saw the film at the recommended time and at the completion of the chapter. Another group saw the clips only, twice. The third group saw the film at the recommended time plus the clips spread throughout the teaching of the chapter.

After completion of the experiment, the students were given an objective test of forty items on the material covered by the clips. Also, both the students and teachers were asked to complete a questionnaire.

The questionnaire seemed to indicate that the students and teachers thought that the clips made the understanding of the material presented in the film more easily comprehensible.

A statistical analysis was done on the results of the objective tests using the t-test of difference between means. On the t-test between "recommended use plus clips" and "films only" the results were significant at the .01 level, indicating the "recommended use plus clips" mean to be significantly higher than the "films only" mean. In the t-test between "clips only" mean and "recommended use plus clips" mean, the result was significant at the .01 level also. The mean of the "recommended use plus clips" being higher than the "clips only" mean. The t-test between the means of the "clips only" and "films only" treatments was not significant at any level.

The results seem to show there is an indication that the use of excerpts from films, when used in connection with the full film, does increase the learning of material from CHEM Study films for chemistry students.

C. The Trinklein Dissertation

One of the Ancillary activities resulting from the Project, but carried out at no cost to the Project was a research effort by Lloyd Trinklein, Project Associate from 1964-66. Dr. Trinklein was concerned with the uses of single concept films and the following abstract describes his study.

ABSTRACT

A COMPARATIVE STUDY OF THE EFFECTIVENESS OF USING A FULL FILM AND SHORT FORMAT FILMS TO TEACH CHEMISTRY

by Lloyd A. Trinklein

The abstract consists of three parts: A summary of the design and findings of the study, conclusions and recommendations.

Summary

The major purpose of this study was to investigate certain modes of instruction, involving single concept films, in comparison with the use of a full length film. Specifically, this study compared the relative effectiveness of a full film with combinations of excerpts from that film to teach factual information to CHEM Study students.

The sample for this study consisted of 382 students from sixteen school systems throughout the lower half of

Michigan. Eighteen teachers from the eighty-nine school systems that had purchased classroom quantities of CHEM Study materials in 1964-65 were selected to participate in the study. The sample contained 231 boys and 151 girls. On the Otis Quick-Scoring Mental Ability Test, the students ranged in IQ from 64 to 135. Small and large schools were involved as well as public and parochial.

The media which were utilized were various combinations of the film BROMINE-ELEMENT FROM THE SEA and excerpts from that film. The film is one of twenty-six prepared for use in the CHEM Study curriculum.

The content which was measured by the objective tests was the concepts, descriptive material, and principles that were given in the film excerpts.

The test materials used in the study consisted of the Otis Quick-Scoring Mental Ability Test, Gamma Test, Form Fm, and an objective pretest and a posttest which were prepared and validated by the experimenter.

Each class was assigned to one of three treatment groups. These three treatments are: (1) film only, (2) excerpts only, and (3) a combination of the film and the excerpts. The filmed treatment was applied during the teaching of chapter nineteen of the CHEM Study text. Each teacher was unrestricted in his teaching of the chapter, except for the showing of one of the filmed sequences at specific points in the chapter as assigned by the experimenter. To equalize the exposure of the students to the subject matter to be tested, each class saw the filmed material twice.

The null hypothesis that was tested was: There is no significant difference among the means of achievement gains of three groups of students who have been taught factual information by a film, excerpts from that film, or a combination of the film and excerpts from that film.

The data which were analyzed to test this hypothesis were the differences between each student's pretest score and his posttest score--his achievement gain. Since significant variance was found among the three groups on IQ, analysis of covariance was used to analyze the data, controlling for IQ. An F ratio of 63.893 was computed for this analysis. Since an F ratio of greater than 3.07 was necessary for rejection of the null hypothesis with 2 and 378 degrees of freedom and with a .05 level of significance, the null hypothesis was rejected; Scheffe comparisons were computed to determine directional relationships between the adjusted means of the three groups. The result of these comparisons showed the adjusted mean of the combination treatment to be significantly greater than the adjusted means of either the film or excerpts treatments, and the adjusted mean of the film treatment was significantly greater than the adjusted mean of the excerpts treatment.

A student questionnaire was also analyzed to determine student preferences on the filmed sequences.

Conclusion

A combination of a full film and excerpts from that film is more effective for teaching factual information to CHEM Study chemistry students than either the film or the excerpts alone. The results on the questionnaire indicated that the students were most satisfied with the combination treatment.

Recommendations

Four general recommendations are made by the author:

1. More emphasis be placed on instrument writing for future studies.
2. Single concept film should be made easily available to teachers.
3. Packages of single concept films and longer films should be prepared for instructional use.
4. Short format films could be used in programed learning situations.

Five suggestions for further study are recommended by the author:

1. A replication or replications of the present study should be done in another subject matter area and at different grade levels.
2. A study should be conducted to determine the effectiveness of whole film-short film combination for purposes other than the transmission of factual information.
3. A determination study for the most effective placement of the full film in the combination should be carried out.
4. A study of retention should be done.
5. A comparison of individual use of short films with classroom use in the combination would be profitable.

DISSEMINATION EFFORTS

Reprinted in Appendix XII are several articles appearing in national publications by Project staff members.

In addition to these publications, several addresses and reports were made on behalf of the Project.

*DAVI--National Convention, 1965--Milwaukee, Wisconsin: "Report on the Single Concept Film Clip Project" by Elwood E. Miller and James L. Page.

DAVI--National Convention, 1966--San Diego, California: "Promises and Pitfalls" by Elwood E. Miller and Charles G. Bollmann.

DAVI--National Convention, 1967--Atlantic City, New Jersey: "The 'Case' For The Short Film" by Elwood E. Miller and Charles G. Bollmann.

In addition to the above national meetings, the Project Director has addressed the Michigan Audiovisual Association, The New Jersey School Boards Association, Educational groups at the University of Colorado, The University of Southern California, and The University of Oklahoma.

*The Department of Audiovisual Instruction, a department of the National Education Association.

Closing the Film-Projector Availability Gap

by *James L. Page*

In addition to being Assistant Director of the Audiovisual Center at Michigan State, Dr. Page is the Director of that university's Single Concept Film Clip Project.

Since the introduction of 16mm sound motion pictures to education, many teachers have been enthusiastic about the value of films in the instructional program. Research studies have indicated the effectiveness of good films in education when they are properly utilized.

PROBLEMS OF FILM USE

The relatively high cost of conventional teaching films however, necessitates their storage, retrieval, distribution, and maintenance in centralized film libraries operated by towns, cities, counties, states, and institutions of higher learning.

This creates problems for the teacher who uses films for instruction. He usually must order films far in advance to guarantee reservation of the film. This does not guarantee the film will arrive at the most appropriate time for the students' learning situation.

Another problem is that more and more teachers find themselves using only parts of regular teaching films in instruction. Excerpting of this kind entails winding the orthodox film forward to the appropriate "clip" or "clips." This becomes complicated if two or three short segments are involved and they do not come in order.

Although 16mm projectors have improved technically and are becoming increasingly less complicated, their operation and relatively high initial cost also tend to limit rather than allow greater use of teaching films in education.

The above comments are not to imply that the 16mm teaching films, as we know them today, will become obsolete tomorrow. But the writer believes that there is a need for low cost film and simple operating projector hardware to fill the gap between on-the-spot classroom needs for film media and the more remote orthodox services of our many central office film libraries across the country.

FILLING THE FILM-PROJECTOR GAP FOR EDUCATION

Concrete evidence that indicates we are moving to fill this gap is the presence of such devices as the Technicolor 8mm silent continuous loop cartridge projector and the Fairchild 8mm magnetic sound continuous loop cartridge projector.

The Technicolor projector has a film capacity of four minutes and Fairchild's projector has a film capacity of twenty-two minutes. Technicolor's basic projector costs approximately sixty-five dollars and Fairchild's Mark IV rear screen projector is priced at about five hundred dollars. Both projectors feature extremely simple operation movements. Films in Technicolor cartridges cost approximately ten dollars each while a sound film in an 8mm Fairchild cartridge costs from thirty-five dollars up.

It is expected competition will be motivated by increased Federal Government support to education. There is a tendency for film and hardware companies to design similar products for the amateur, educational, business, and industrial markets. This will help increase volume and lower the unit costs. Additional companies will enter the film projectors design production field which will guarantee refinements and healthy competition in the field.[1]

LARGE VOLUME—LOW COST—SIMPLE OPERATION

The results should be (1) mass availability of high-volume low-cost film and projector equipment, (2) mass availability of simple-to-operate projectors, and (3) local immediate access to brief films closely correlated with classrooom curriculum or business, industrial training, and sales needs. Signs that education has a good start with the brief films is the fact that there are now several thousand films in continuous loop cartridges on the market for the Technicolor projector. This represents production efforts of less than five years.

Technicolor has not released figures indicating the number of its 8mm cartridge projectors sold in the United States to date, but Mr. Robert Krieman of Technicolor has indicated that fifteen percent of the 1963-64 sales were to education. This figure increased to thirty percent in 1964-65. The rest of the sales were made to business and industry with a small percentage to the amateur market.

Members of the Michigan State University Single Concept Film Clip Project review the content of a longer educational film in search of sections for excerpting. Left to right: Lloyd Trinklein (Science Preview Specialist). Cass Gentry (Assistant Director of the Project), and Ardith Hannah (Science Preview Specialist).

The doubling of Technicolor projector sales in education in one year is significant. The fact that an increasing number of cartridged films for these projectors are being made available is also significant.

It is important to look into why single-concept 8mm films are attractive to educators and how they are utilized to improve production. In addition to the low cost and simple operation features the films lend themselves to the following:

1. General presentation to a class by the teacher to motivate students, introduce a subject, or demonstrate some pertinent phenomena.

2. Viewing of film loops in a logical sequence of experiences correlated with other media on an individual assignment basis.

3. Use of the film loop cartridge projector with stop-frame and motion as a vehicle for programed instructional experiences demanding motion and still picture sequences for individual students.

4. Ability to use the portable cartridge projector in the instructional media center, classroom, or home for general reference work.

SOURCES OF THE BRIEF FILM

One source of brief film sequences in 8mm or 16mm form is extracted footage from existing films and adding necessary titles, supers, and inserts. The other source is the design and production of original footage for specific areas.

Each method has its limitations and advantages. Obviously a film clip designed and produced from the script to the final package has the advantage of (1) original design and production for the specific objectives involved, and (2) optimum consideration for such technical considerations as object size in frame and the full use of the several unique contributions of the film medium for maximum effectiveness to help meet the communication objectives.

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(1) **Editor's Note.** The Jayark Instruments Corporation has recently entered the market with an 8mm magnetic sound continuous loop cartridge projector, the Jayark 8.

On the other hand, the extraction of brief films from existing motion pictures offers the advantage of (1) saving money through use of footage already available and (2) saving production time with necessary minor graphic or sound treatment.

MSU FILM CLIP PROJECT

The Single Concept Film Clip Project conducted by the Michigan State University Audiovisual Center in cooperation with NDEA, Title VIIB, U.S. Office of Education, is a study investigating the optimum processes involving the selection, storage, retrieval and projection of brief film clips and loops.

Approximately eight hundred film clips have been identified for extraction in the first twelve months of the two-year study. Treatment sheets are being prepared for each clip including the title of the clip, title of original film, content summary with primary and secondary vocabulary words, subject area, grade level, the necessity for sound or silent application, specific graphic treatment including titles, supers, and inserts, and exact footage and frame figures identifying where the film sequences were extracted.

Film companies are making their films available to the Project on a cost basis for research use. Treatment sheets are being made available to cooperating companies as soon as they are complete in the hope that they may produce more brief educational films in the near future. The final Project report will be available after it is completed July 1, 1966.

Two pilot studies have revealed that teachers in science and social studies, when asked to view identical films in their field for the purpose of selecting worthwhile and meaningful brief film clips for instruction, usually agree on the same approximate sequences sixty to seventy percent of the time.

All film clip selectors on the Project have had considerable teaching experiences and are well aware of the unique contributions and capabilities of the film medium. This, plus extensive background in their subject matter makes it possible for them to provide treatment information for the selected film clips.

Experience to date suggests that future film design and production people should seriously consider using a subtle modular format which lends itself to low cost operations when extracting sequences from the orthodox film for the brief film format.

PROJECTORS FOR THE BRIEF FILM

Much must yet be done to upgrade projection and film capabilities:

1. The film size and frame format must be standardized. This will guarantee more films and minimize confusion in the field for the users. It should not curtail competition and innovation. Perhaps the new Super 8mm formal introduced by Eastman Kodak will be the answer.

2. The efficiency of the optional system should be improved to obtain a more brilliant image allowing for use with large groups as well as for small groups and individual viewing. The light source and optical system could be modular to accomodate different instructional situations.

3. Emphasize research to provide a low cost optical sound feature for the brief film projector. Economical mass production of film favors the optical sound and not the magnetic sound track film. The optical sound feature could also be modular in the over-all design of the projector.

4. Adopt a liberal plan to clear copyright agreements which will assure reasonable profits and high volume sales of brief films selected from existing footage.

5. Eliminate the friction problem found with the continuous loop film cartridge. Perhaps this could be best done by employing the standard movement found with tape recorders on the market today. Use a cartridge with two films reels applying the fast forward, reverse, project, and stop frame features.

There is no doubt that the film-projector availability-use gap in education today will become less if the above stated conditions are realized. How fast the gap will be bridged depends when the basic film and quality standards are adopted by industry and on the rate of growth of good films that will be made available in the easy to use film cartridges and projectors fot education and training programs.

James L. Page and
Elwood E. Miller

A Major Breakthrough in Film Use?

FILMS FOR THE FEW?

Since initial educational films first appeared in quantity in the 1930's, 16mm motion pictures have never had the effect upon education envisioned by early audiovisualists. True, hundreds of film libraries contain thousands of films used by tens of thousands of teachers. But a little arithmetic, used to compute the average use of films per teacher per month, makes the audiovisual professional somewhat discouraged. It is terribly low when the potential of film use is dreamed about.

For example, a leading educational film production company indicated to the writers that 75 percent of its sales go to approximately 1,200 film libraries in the United States. When you realize that the sale of 3,000 prints of a teaching film is considered high, it doesn't take long to see there is a problem making such material available to the 53 million students in elementary and secondary schools and colleges and universities.

BARRIERS TO FILM USE

Standard 400-foot black-and-white teaching films cost about $60 apiece, with the color print costing approximately double this figure. Film library handling and maintenance costs must be included with the rental costs. The rental of an average black-and-white teaching film, including postage, is about $3.50 to $4.50. Most teachers have very limited film rental budgets, which prevents their using many excellent film resources.

What additional problems or barriers prevent a really major injection of films and their enriching experiences into the classrooms of the American school system? Perhaps two of many reasons can be identified and discussed briefly.

First, films are not readily available. They must be ordered or requisitioned, and in many cases rented and provided for from someone's budget. The time necessary to cut through this red tape and have the film arrive at the precise moment when it can be of the most value to the educational pattern is a problem. Only a relatively few school systems are adequately funded and equipped to provide films locally to minimize the availability problems. Clearly, something should be done to remove, or at least to lessen, this large barrier to good film use.

Second, the sheer physical problem of managing a complex (at least in the eyes of the majority of classroom teachers) instrument for projecting films causes many teachers to give up before they ever get started.

BETTER INSTRUCTIONAL USE WITH FILM LOOPS

Visualize, if you will, a technological system that would include a machine as simple to use as a record player or television set, along with a library of films and film clips of a short nature designed around the single concept idea. A library of inexpensive film clips or loops could be purchased by the school or a department and kept on hand. The filmed material would be cataloged and filed in each school building. This approach could hold much promise for teachers interested in the effective use of films in their regular instructional pattern.

Single concept films, particularly films reproduced in silent or sound in the 8mm or modified 16mm media, are certainly not new in this business. Forsdale, of New York, has studied and written prolifically in the single concept field. The research under way is based upon the assumption that this is a legitimate and important curricular use of the 16mm film medium.

The past 24 months have seen the introduction of the Technicolor single concept film system and the production of approximately 2,000 individual film clips for use in these simple, nearly fool-proof machines. Two thousand single concept film segments is only a start, and a small one at that, when one considers the hundreds of thousands, yes, the millions of ideas that could be subjected to this style of treatment. Production of this multitude of filmed concepts cannot wait. New ideas are being generated so fast that film producers can't keep up with, let alone gain on, the speed of modern information development.

SINGLE CONCEPT FILM CLIP PROJECT

A new film research project, jointly sponsored by the U.S. Office of Education and Michigan State University in East Lansing, holds the promise of helping to find a new system for film use, a system that may show the way to overcoming these two major obstacles to effective film use.

This is not to infer, of course, that this is the only endeavor involved with the study of selection and application of single concept film clips in education. Several universities, commercial film companies, and the Armed Forces are currently investigating and working on developments in this field.

The Single Concept Film Clip Project takes the position that a large amount of this needed material can be retrieved from educational and instructional films that have already been produced. This material, with suitable editing and with title and sound treatment (based on the findings of our research teams), could very well serve as a basic library of single concept films.

This hypothesis will be tested by teams of subject matter specialists studying and clipping films in a number of curricular fields. A pilot study during the summer term of 1964, at Michigan State University, with a chemistry study group of the National Science Foundation has already shown that the problem will be a complex and interesting one. A group of 60 chemistry teachers studied 26 CHEM STUDY films and reported on their possible uses in this manner. The data has been placed on punch cards and is under study by the investigative section of the research staff. We are looking for answers from the pilot study to such question as: How does the age, formal education, teaching experience, and professional position relate to the number and kinds of film clips that teachers select from existing education films in their field? These findings will have a direct bearing on the selection of appropriate film previewers assigned to select "single concept film clips or film loops" in the future.

Another problem that arises early in the single concept investigation is the storage, retrieval, and classification question. A section of the research staff is concerned with studies of electronic and physical systems of managing this vast problem. Upon successful findings in this area will hang, perhaps, the entire future of the single concept project.

Still another group of the staff is concerned with some freewheeling and brainstorming on the development of specifications for a suitable technological device to convey the images and the sound. What type of machine can be devised that can be fool-proof, cheap, and dependable? Only a system that can insure a real mass market, a market that has never been available to the machine manufacturers in the past, can have a fighting chance of success. However, a society that can talk seriously about placing a man on the moon in the next decade, that can devise self-powered TV sets that teen-agers can afford, that can engineer dolls that talk, walk, eat, and wet their beds, surely can manage this problem!

UTILIZATION FACTORS

Another phase of the study—one that is not included in the initial contract between Michigan State and the USOE, but one that the staff hopes fervently someone will continue with —involves the precedent-breaking curricular uses and patterns of instruction that will have to follow the massive injection of such an idea as this in the classrooms of today. The results in the classroom are the only criteria of effectiveness of the research proposal, and these should be studied and reported on immediately following the initial findings of this study.

Educators and producers of educational films are concerned about the proper place of film clips in the curriculum. Film clips are ideal for short, crisp presentation of otherwise impossible or difficult-to-present experiments, examples, or illustrations. Film clips or loops will not stand alone but will be well integrated with other media and techniques to contribute to the learning situations.

The typical 16mm educational film usually has self-contained features including the introduction with motivating features, the body of the content information, and a short review with implications of the content reviewed. Past research indicates much learning mileage can be realized if the film is properly previewed, introduced, projected, viewed, and reviewed.

With research indicating the importance of good utilization techniques with orthodox-length teaching films, good utilization should apply even more to the use of the single concept or short instructional film clip. In order to be useful, the clip will have to be well integrated in over-all presentations.

A MAJOR BREAKTHROUGH? SOME IMPLICATIONS

The value of good film clips to the teacher is apparent. Mass production application with film clips should reduce the price of two- to four-minute 8mm clips to the price of inexpensive textbooks. This will make film clips available in large quantities to many teachers at a moment's notice. Students also will have access to the clips on a small-group or individual basis. The authors believe that increased use of film clips also will increase the use of related films. Orthodox teaching films may tend to be used more for summary teaching rather than introductory teaching as film clips become more widely used.

The 8mm Technicolor cartridge silent projector is a major breakthrough. Film cartridges with teachers' guides including vocabulary, a brief description, and related utilization recommendations can help improve the instructional program. When sound can be added to the package with up to 50 percent increase in the frame size, at a price comparable to the price of the present projector, a significant breakthrough with the use of film clips will be experienced. Then, perhaps in the near future, a sophisticated system of storage, selection, and transmitted projection of film clips on a random selection basis in the classroom will be available to teachers.

It is the belief of the staff members of this Single Concept Film Clip Research Project that this study holds the promise of a real breakthrough in the field of 16mm film use in American education.

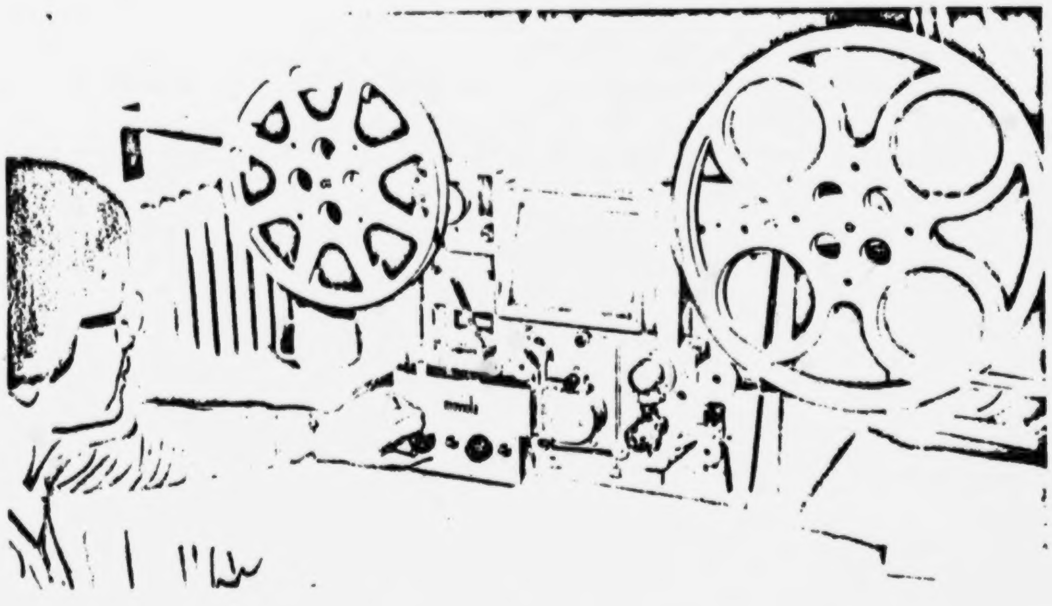
Film Editors Gunter Pfaff (standing) and William Hughes cut and edit selected footages for the clip project.

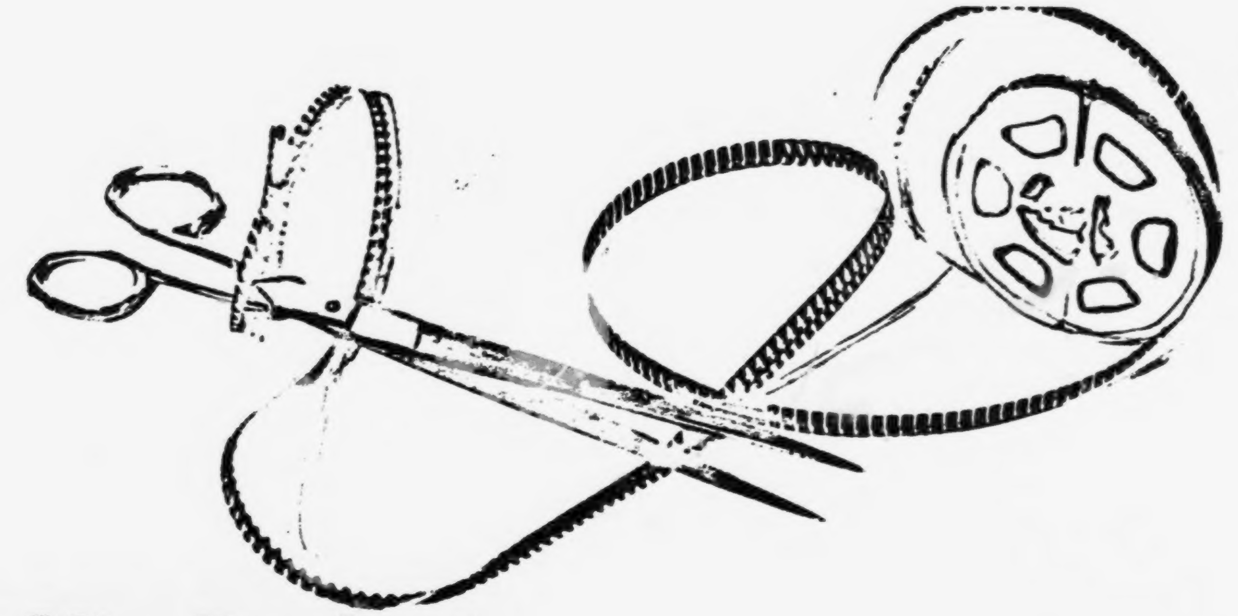
We also believe that the many excellent educational films available on the market today will continue to be used more in educational programs. In fact, the use of many inexpensive packaged short sequences from existing films, or originally produced film clips, should stimulate teachers to use more orthodox educational films.

Since this media is at the heart of the entire audiovisual movement, the changes in our professional field could ripple out in all directions.

Charles F. Schuller, director, Audiovisual Center, Michigan State University, East Lansing, is project coordinator of the Single Concept Film Clip Project. James L. Page, assistant director, Audiovisual Center, is the project director. Elwood E. Miller, educational media specialist, is associate project director. Questions and requests for further information can be addressed to the project director.

Mrs. Ardith Hanna, special science consultant to the project, studies one of the films under consideration on the Moviola Library reader.





Film Clip Project

HALFWAY POINT

Elwood E. Miller, James L. Page, Ardith Hannah, and Lloyd Trinklein

The Michigan State Single Concept Film Clip Project, conducted under the provisions of Title VII-B of the National Defense Education Act, aims to develop practical systems for the selection, storage, retrieval, maintenance, information dissemination, distribution, and projection of single concept film clips from existing instructional films and, when these are achieved, to provide educational and production agencies with information and practical methods by which comparable systems can be established.

The project began July 1, 1964, extending to July 1, 1966. With the project more than halfway through the assignment, we have encountered many interesting developments related to the objectives.

Points of Agreement

Nearly all educators, film producers, and equipment manufacturers agree on several items. A cartridge is necessary to enclose the film itself, a cartridge that is virtually tamperproof. Human hands are basically responsible for film damage. If loops are to be used continuously without inspection between each use, an automatic cartridge system for entering the film in the machine is an absolute necessity.

Film clips must be marketed in the same price realm as reference books. If the film clip volume is to swell to the point where short filmed sequences are marketable, this price bracket is a necessity. The machine must be simple and efficient to operate. Simplicity is possible, and machine costs will depend upon potential volume.

What is the place of these materials in the curriculum patterns in today's schools? This question has been discussed only in sweeping generalities. Many school systems are buying the present 8mm silent loops in quantity without attempting to define where they fit legitimately within the scope of their curriculum.

Should they be used specifically in a programing sense (that is, entered in a course of study at predetermined positions), or are they best for library use on a random or exploratory basis? Should groups use them, or should they be reserved for individual use? No carefully researched answers to these questions are available at the present.

Project members have seen many instances where school administrators are purchasing the silent film loops, turning them over to individual schools, and assuming that the teaching staff will come up with the answers to these questions. Much investigation is still needed in the basic area of utilization.

Some Points of Disagreement

Sound or Silent? About 50 percent of the clips identified in this project seem to have applicability for silent use, and the other half are relatively unusable without a sound track. The trend in the field seems to be in the direction of providing equipment with a sound track. This seems to be a natural process of development, almost paralleling the early 16mm projection devices of the 1930's. Sound followed silent almost automatically.

Optical or Magnetic? Two easily identifiable thoughts can be seen here. Many film producers state flatly that an optical system is necessary if the films are to be volume items. Laboratory people tell us with increasing frequency that the stripping and placement of a magnetic track is only a trifle more expensive, *given a large volume operation.* There is little question that magnetic sound is superior in fidelity, but probably not enough to influence a basic decision.

Is 8mm Adequate? Yes, and then again No, say the users. For individual or small-group study, little question remains as to its adequacy. For large classroom situations the screen resolution with standard 8mm devices leaves much to be desired. Sixteen millimeter projectors give far superior screen images, but no hardware is available for using the standard 16mm format with self-threading, cartridged film segments. One equipment manufacturer predicted at the July 1965 NAVA meeting in Chicago that this type of machine would be generated out of the needs in the area, but not for several years.

Super 8, Kodak's new format, *may be* a suitable compromise, but its effectiveness remains a question. The acceptance of the format by the amateur market will also influence the long-range availability of this system to education.

Other unique systems of projection have been studied by the project. Several interesting compromises have been examined. Included are such systems as twin-tracked 16mm film (two visual and two sound tracks with a horizontal format on a single standard 16mm film), double 8 images (lateral projection of an 8mm filmstrip with the image size twice the normal 8mm image), and even a 70mm film system with 12 visual and audio tracks.

Where Will It All End?

In our opinion, some standardization is necessary within the industry, or the basic idea may not grow much beyond its present state. This would be most unfortunate, for the basic use of films in the short format, single concept manner represents a new and exciting potential system of improving instruction by continuous injection of the proper filmed sequence into curricular patterns. The potential improvement to instruction shows promise of real significance.

Some 1,000 film clips have been actually lifted from about 350 films as of fall 1965. Producers are now receiving printed suggestions for production of such short films.

Cass Gentry, project assistant, completed his doctoral dissertation in the summer of 1965 and is at the University of Maine as audiovisual director. His dissertation work was with film clips in a learning theory investigation.

Although the Single Concept Film Clip Project is not commissioned to study the utilization of film clips in learning programs, we have found that the project has stimulated several utilization studies on a by-product basis.

Project By-Product

Project Assistants Ardith Hannah and Lloyd Trinklein, who are science education specialists, have given an interesting report regarding their pilot study introducing film clips from the CHEM Study film series into the Detroit Public School System.

The Detroit study was based on the assumption that short excerpts from the CHEM Study films would teach more of the content in the films than the use of the film alone. The sample included three teachers and 153 students enrolled during the spring of 1965 in six Chemistry II classes at Detroit Denby High School. The film chosen was *Bromine—Element from the Sea,* designed for and integrated into Chapter 19 of the CHEM Study text.

Three experimental groups of two classes each were established to test the hypothesis. One of these groups saw the film at the time recommended in the teacher's guide and again at the completion of the chapter. A second group saw the clips only, twice. The third group saw the film at the recommended time and also saw the clips once at designated places throughout the chapter. Before showing the complete film or the clips, the teachers read a related prepared summary to the classes. Questions were provided to use as a basis for discussion after showing the film or clips.

At the completion of the experiment, the students were given an objective test of 40 items based on the subject matter covered by the clips. Also, both the students and teachers were asked to complete a questionnaire.

A statistical analysis was done on the results of the objective tests using the t-test of difference between means. In the t-test between "recommended use plus clips" and "films only" treatment, the results were significant at the .01 level, indicating the "recommended use plus clips" mean to be significantly higher than the "film only" mean. In the t-test between "clips only" mean and "recommended use plus clips," the result was significant at the .01 level also, the mean of the combined treatment being greater. The t-test between the means of the "clips only" and "films only" treatments was not significant at any level.

The results of the questionnaire seemed to indicate that both the students and teachers thought that the use of the excerpts made the subject matter more comprehensible. Some of the effectiveness of the short films was lost because these were not cartridged. One of the major advantages of short films will be the ease with which they can be used. If they are cartridged, no time is involved in threading a standard projector; and they are easily repeatable. The questionnaires reflected this shortcoming in the study.

The results of the study seemed to indicate that short excerpts from films can be used to teach as effectively as can the full film. Also, when these excerpts are combined with the use of the full film, a significant gain in learning can occur. The major conclusion of the persons involved in the study indicates the need for more research in the teaching effectiveness of short format films.

The above paragraph is most significant. Film clips or brief films are with us to stay. We must find the best ways they may be used to realize optimum learning results.

ELWOOD E. MILLER

A-12i

SINGLE CONCEPT FILMS: CRITERIA FOR CLIPPING

Both well-established and new film producers who are interested in the new single concept idea (not to mention the market that seems to be developing in the short film field) are universally being forced to face a basic organizational and policy problem. To paraphrase the Bard, "To clip or not to clip, that is the question." Whether it is nobler to excerpt single concept films from existing footage within films now on the market —or from the many miles of outtakes within their film vaults—or to shoot from scratch such single concept films, of such sticky problems are ulcers made!

Some of the findings of the Single Concept Film Investigation at Michigan State University might well be considered by those attempting to develop policy and procedure decisions on this important and very basic question.

What Is a Single Concept Film?

Without becoming smothered in a morass of psychological interpretations on a definition of the term *single concept*, and because it is necessary to have a base definition to hang decisions on, we are willing to live with a short and admittedly incomplete definition of a single concept film. For purposes of this project, we will identify a single concept film as a segment of a film with a short, discrete, describable instructional content.

Some Basic Issues

Let us take a few of the basic issues and problems and consider them one by one.

1. The crop is ripe . . . let us proceed with the harvest. Federal money in the instructional materials field does have an influence on sales and the resultant products. Only the naive would assume that this factor is not a basic one in the thinking of the business community. Let us not cast stones, for injection of these kinds of materials into the curricular patterns will have far-reaching and broad ripple effects in instruction for many years to come. The effects will continue despite the differential in the final quality of the films themselves. And so the crop is ripe for the film producer, and it is no less ripe for the educator.

In thinking ahead, it is to our advantage within the educational community to gather large numbers of those types of materials into instructional materials centers and put them in use within the teaching patterns of the schools. There is something to be said for "momentum," if you subscribe to the basic validity of the idea itself. Very few educational materials have really been validated before they are placed on the market, and in this context the "quick and dirty" film excerpt is no worse than most types of educational materials, both printed and nonprinted.

Yet, after looking at hundreds of films and thousands of excerpts, those of us on the Single Concept Project have come to believe that the best single concept film is probably one that is created for a definitive instructional job. Likewise it should be tested and revised, much as any other quality teaching material should be tested, evaluated, and revised before marketing.

2. Large volumes of single concept films are necessary to make any real impact on instruction, and then learning. Just as a small library with material limited in both quality and quantity is of limited use, so will a single concept film collection of small nature be of very little value. The teacher willing to use single concept films in his instructional pattern, regardless of the pattern, must first be able to identify the film that illustrates the concept, and then to physically lay his hands on it. It is virtually impossible to identify initial collections of a sufficient size without looking to the excerpting solution, in the short-range scheme of things.

3. The decision to excerpt single concept materials from existing films poses some very knotty problems for the film producers. Just a few of these problems are identified here, but might include:

Copyright, ownership, residual rights. Many film producers actually market films that are not of their original production. From whom do they get clearances to reuse the films in a new form? How about the original producers, talent, and directors of the film? Even when the producer actually created the film within his own organization, problems of this nature must be solved.

Approach problems. Where do they start? Do they actually cut and edit the original master print or negative, thereby losing the ability to sell additional release prints of the original film? Or do they work from a good first generation print, thus losing some of the quality of the first generation release print? Again, problems of this nature are forcing the development of new policies within the organization.

Sales potential. Does the marketing of segments of a good instructional film tend to ruin the potential sales of the original film? We think not, in that in the perception of the project staff, single concept films are essentially a different medium from standard instructional films.

Useable materials in outtakes What about outtakes, or those portions of unused footage from previous productions that fill shelves in every film producer's vault? Producers admit that there is a wreath of useable material in these filmed outtakes, and yet the practical matter of retrieving the right footage is most difficult. Few film producers (we know of only one) have actually made organized efforts to classify and organize an information management system to find useable sections of in-vault footage.

The list could become quite extensive. These few points are introduced only to remind the reader that the problem is not as simple as one might expect at first glance.

4. Assuming many of the problems of the preceding paragraphs could be overcome, what are the criteria that really make it possible to identify suitable single concept type materials within presently circulated instructional films? Many of these factors that make motion pictures a unique medium serve equally well to make single concept films a very useable and valuable instructional tool. Criteria for film taught in any good basic audiovisual course are equally valid for short films. For example, for the film clip project the staff selected only those filmed sequences that were appropriate for the motion picture medium. The films basically were sequences that needed motion, (normal, slow,

or time lapse); films that introduced into the classroom experiences that could not be introduced as effectively any other way (for example, life in a Peruvian village); films that bridged the time barrier (historical sequences); and films utilizing many special types of techniques (photomicrography, microphotography, animation, and so on).

General Criteria

Several generalities can be stated from our experiences. None are revolutionary, but our evidence is complete enough to convince us of their accuracy.

First, the age of the original film is a determiner in clip selection. Generally, films older than five years in release date were not very productive. They were outdated in technique, not acceptable in the curriculum movements in today's educational pattern, or technically inferior. Obvious exceptions to this generalization would include historical news-type footage and sequences of a classic nature.

The second generalization must force a look at the problem of original film quality. Although qualitative analysis of an instructional film is a nebulous task, there can be no doubt that many films contain creative qualities, production efforts, and expenses not contained in others. Films that are essentially filmed lectures or kinescope recordings of television programs must be identified as not being of the same stature as other, more imaginative films. We found that good, precise, and imaginative films were usually more productive in high-quality single concept clips than films of lesser quality. In general, we will stand by the statement that good films yield good clip sequences, while poor films yield few clips, and generally ones of an inferior quality.

Furthermore, filmed lectures are not a good source of single concept filmed sequences. Occasionally, a demonstration is useable, but our analysis of one complete science course on film produced less than one useable clip per 40-minute film.

What was the prime source of useable film clips? The following kinds of sequences are the prime sources of good quality, short single concept filmed sequences.

1. Animated sequences. The art of animation is one of elimination of all nonessentials to transmit a message. In effect, this too is the job of the film producer who is interested in single concept films. It follows that animated sequences in instructional films should yield a high volume of single concept films. This rather obvious hypothesis can be substantiated in analyzing the types of filmed sequences identified in the investigation. Most sequences resulting from the animator's stand were useable in the new format. The extremely high production costs of animated sequences make it imperative that these segments of film be retrieved where and whenever possible.

2. Demonstrations of an esoteric nature. Many films contain footage that demonstrates types of experiences or processes that cannot be brought directly into the classroom because of the expense, danger, or unavailability of the actual event. Many of these segments are retrievable for single concept use.

3. Discrete segments. The excerpters found a good many films that are a collection of rather discrete segments. Such films seemed to have been produced in segments, and then edited into a complete film. These films came apart rather easily and would seem to be a good source of single concept material. Typical of these kinds of films are several of the "Chem Study" series of films for the Chem Study Curriculum.

4. Presentation modes. A substantial number of films were presented in such a manner that they too "came apart" rather easily and would make good segmented teaching films. Point-of-view films where several views were explored are typical of a film of this nature.

5. Multiple segment knitting. In a number of instances we found it possible to lift a number of segments and knit them into a single potential film clip for single concept use. The point at which it is not economically feasible to re-edit films of this type as compared with shooting the clip from an original script, is one that must be identified by producers with access to more accurate production costs than we had available.

Summary

In summary, two things must happen in the near future in order for a genuine breakthrough to take place in the single concept field. At first glance the two may seem to be mutually exclusive, but in reality they must happen almost simultaneously.

Initially, better hardware with sound track capability (while maintaining the multiple advantages of the cartridged film) is necessary. These must not be junior editions of the present 16mm film projectors, differing only in the width of the software within the machine. They must be machines of a truly new conceptual nature, machines that can be mass-produced for this market that is potentially many times the size of that for standard films.

Secondly, substantial quantities of short filmed segments of a single concept nature must appear. Although nearly three thousand silent film loops were on the market at the first of the year, the overall quantity must be many times this number. Naturally they must be of reasonably good quality with quality increases appearing regularly.

"To clip or not to clip" is still an unsolved question. We believe that substantial quantities of very acceptable films at the first stage of the medium can be retrieved by film producers by the excerpting method. But even more important, the collection of clips must become better and better as time passes. The buyer must remember a basic difference between this kind of film and standard films. These are high-use, short-time films that will and should wear out each year. Therefore increases in their quality is possible as producers issue second, third, and fourth editions of their single concept materials. The major questions still are unanswered at this point, and the National Audio-Visual Association members are the only ones that can answer them. Where are the new machines, and where are the films? We in education need them!

CARTRIDGE FILMS

A SMOLDERING REVOLUTION

by

Charles G. Bollmann

The title chosen for this article suggests that cartridged films are a revolutionary innovation but that a major part of the action is occuring below the surface at this time. There is now evidence that that activity (i.e. research and development) may at last make that revolution break out into a "brightly-burning" part of the audiovisual field.

BACKGROUND AND THE STATE OF THE ART

The chronology of events listed below may help to provide some background information and to indicate the state of the art at this time.

Fall, 1960 —	Introduction of the Technicolor "Instant Movie" Projector
November, 1961 —	Conference on 8mm Sound Film at Teachers College—Columbia University
Spring, 1963 —	Introduction of Fairchild Mark IV and Mark V 8mm, sound-on-film projectors
June, 1964 —	Inauguration of the Single Concept Film Clip Project at Michigan State University
Summer, 1965 —	Introduction of the Super 8mm Format by Eastman Kodak
December, 1965 —	Introduction of Technicolor Super 8 Projector
February 1967 —	National Conference on Cartridged Films at Michigan State University
April, 1967 —	Introduction of New Super 8mm Sound-on-film Cartridge Projectors at Atlantic City, DAVI Convention

In 1961 Professor Forsdale of Columbia University was strongly advocating 8mm sound film (from here to be designated R8 to distinguish it from super or S8) for use in education. At that time he proposed the"A Line" concept and held that R8 sound film provided the opportunity to make filmic experiences more accessible for the use of teachers and, more importantly, learners.[1] Forsdale's "A Line" was and still is a good model, but his predictions for the widespread application of 8mm Sound film while using "open", reel-to-reel equipment was overly optimistic.

Technicolor's "Instant Movie" projector was given one of its early showings to educators at the Columbia Conference. Forsdale and other conference participants were quick to see its potential but at that time didn't place very much stress on the cartridge, perhaps because this model offered no sound track and the Columbia Conference was concerned with S8 *sound* film.[2]

Film material for the Technicolor machine came along rather more slowly than anyone liked. It is this writer's belief that acceptance of the hardware by the field was hard to win because: (1) the machine wasn't adequate for regular class-size groups and most schools were not set-up to use the equipment in small group or individual study situations, and (2) the machine had no sound capability. In spite of these drawbacks, however, the equipment began to sell and films were made for it.

Fairchild's introduction of their Mark IV and Mark V units in the spring of 1963, removed the "no-sound" restriction and in the latter model offered reasonably good screen brillance for class-size groups.[3] Although these R8 machines offered all the advantages of the cartridge, the widespread adoption of this equipment was forestalled by cost considerations. I believe that those who make the purchase decisions in schools were simply reluctant to pay a price for an R8 system roughly equivalent to that of current 16mm systems.

The thoughts presented thus far have been drawn, for the most part, from the work of the Single Concept Film Clip Project (SCFCP) at Michigan State University. Funded by the United States Office of Education in 1964, the idea for the project grew out of the cartridge idea brought to the fore especially by the Technicolor equipment. The project's title, in fact, was derived from the name originally bestowed on films in the Technicolor "Magicartridge". The project personnel, however, realized soon after beginning work that the name was inadequate for several reasons and that the really exciting thing was the *cartridge* itself and not the length of the film nor its millimeter dimensions.

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[1] See Forsdale, Louis, "Broad Contexts" in *8mm Sound Film and Education.* (Edited by Louis Forsdale) New York: Bureau of Publications, Columbia University, 1962, pp. 5-6.

[2] Ibid. p. 6 and p. 10.

[3] Mr. Nat Myers, General Manager of Fairchild's Industrial Products Division, has been correct in saying repeatedly that S8 offers little "screen" difference over R8 in small, rear-projection units. For that reason, Fairchild has elected (at least for the present) not to go to S8.

(Continued on next page)

Although the major part of its first two years of work was concerned with investigating the lifting of so-called single concept excerpts from existing 16mm educational films, the project staff was interested in the broader issues of cartridged films and kept in constant touch with all of the equipment manufacturers working in this area of endeavor. By the middle of 1965 the staff began calling for a lightweight, portable, sound-on-film, cartridge projector which could be purchased for under $200 and which would preferably be adequate for regular class-size groups. At that point there was no committtment to any one film format—only to the necessity for a cartridge with sound film.[4] The project staff felt that once these conditions were met, film would indeed move way down Forsdale's "A Line".

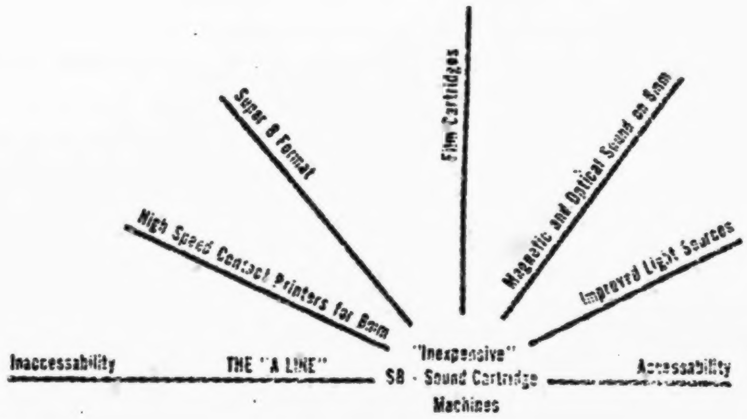
While waiting for a projector with these characteristics, a most significant thing happened--Eastman Kodak introduced Super 8mm in the summer of 1965. By giving more of the film width to the aperature, much more light could be pushed through to reach the screen and with the weight of the Eastman enterprise behind it, the new format took hold rapidly. Eastman representatives admit S8 was really designed with the amatuer, home-movie market in mind but Technicolor (and others) realized that the new aperature size opened the education market for cartridged films for regular class-size groups and a S8 line was introduced in December of 1965.

Again, the production and sale of S8 films in cartridges has lagged even though some film producers and distributors have developed rather attractive trade-in allowance plans for R8 materials and equipment. I believe that again the missing ingredient has been the sound track.

With the appearance of the Viewlex sound-on-film projector using the Mauer 8mm format in the spring of 1966, it appeared that the whole small format film idea in education--by then seemingly inextricably connected with cartridge films--would be stalled for years because of a lack of standardization.[5] Thus the Project staff at Michigan State requested and was granted a year's extension to investigate (among other things) the equipment considerations.

The National Conference on Cartridged films was thus planned to open a dialogue between educators, film producers, and equipment manufacturers on the issue of standardization. The Conference was held in February of 1967, and although we are still digesting and refining the Conference's output, two things were brought into sharp focus.[6] First, the unique aspect of the cartridge is ACCESSABILITY. Second, because of legal and economic considerations, the manufacturers agreed to continue to disagree on equipment characteristics.

Thus, in a way we have come full circle. Movement down Forsdale's "A Line" is tied to the cartridge. The exciting thing at this point is that we appear to be at a point of convergence between three lines of development which have been proceeding simultaneously for a number of years. These converging lines of endeavor are shown in the diagram below.



Although there are other closely related and important lines of endeavor which are also involved (for example, the Bell and Howell, Eastman Kodak high speed S8, 4-rank, sound, contact printer; improved optics; improved light sources; etc.), the lines seem to have merged in the equipment which was displayed at Atlantic City. At least we are to have *CARTRIDGE* machines with at least the following characteristics: adequate for class-sized groups; sound on film; and reasonable price (i.e. half or less than the cost of regular 16mm equipment).

PROSPECTS FOR THE IMMEDIATE FUTURE

It is my conviction that the new machines briefly described above have the potential to restructure completely the use patterns of educational films. By making possible the storage of films much closer to the point of use (say, in individual school buildings) rather than in central repositories, a much more pervasive use of film can be foreseen. This prediction rests upon reduced costs of both hardware and films which now seem possible as well as the full implications of the property of accessibility.

Unfortunately, at least for the present, the film will probably not be interchangeable between cartridges and certainly the cartridges will not be interchangeable between machines.

Since the manufacturers have in effect said that standardization must be reached in the free market, educators will have to base decisions on what characteristics are most needed in specific applications. This leads to the prediction that in the short run each piece of equipment will tend to "carve out" a share of the market in terms of its specific capability (for example, length of material that can be put into the cartridge) and its cost. But it must be emphasized that *we in education must buy and use what is available at any particular moment in time and NOT wait for the millenium when either the perfect piece of equipment exists or when standardization has been achieved as in 16mm equipment.*

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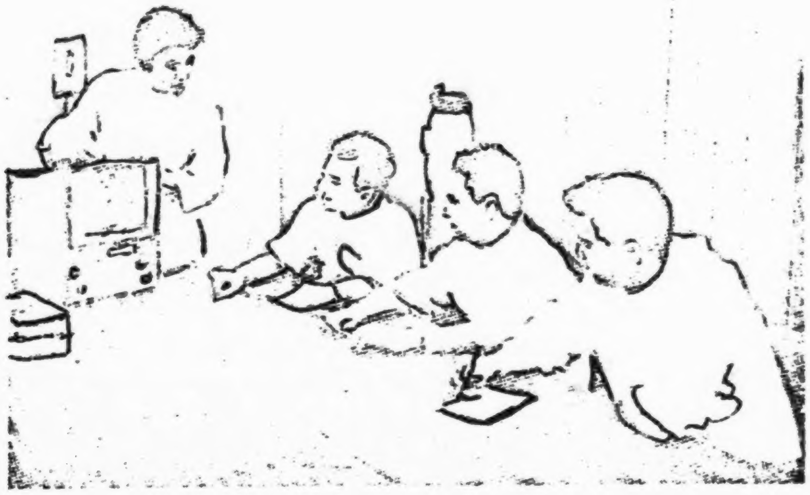
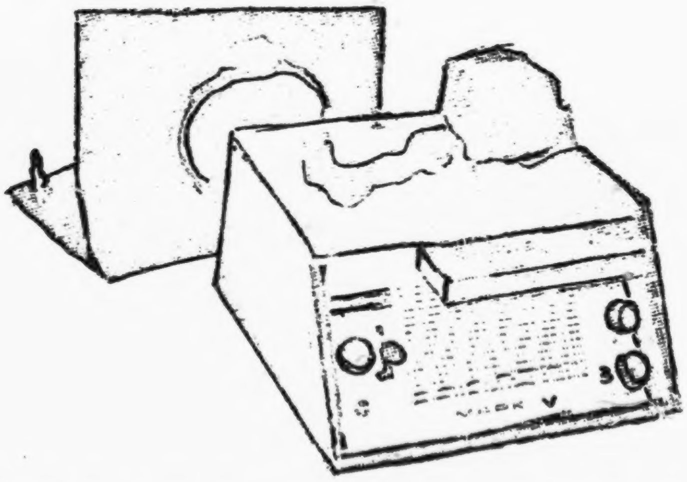
[4] If anything, the staff felt that a reel-to-reel, no-thread cartridge for 16mm was probably the best possibility. Until now no manufacturer has offered such a system. Thus as a Project Staff we are somewhat forced into a committment for S8 because there is or soon will be equipment in that format which meets our performance criteria.

[5] The Viewlex machine appears to be well designed but I will not deal with it or the new DuKane S8 sound-on-film projector because they are not cartridge machines. The interesting 70mm Panacolor (12 optical and 12 sound tracks) will not be dealt with either because to our knowledge it is not yet being delivered to users in the field.

[6] A report on the National Conference on Cartridged Films will be available around May 15, 1967. Write: Dr. Elwood E. Miller, Director, Single Concept Film Clip Project, Instructional Media Center, Michigan State University, East Lansing, Michigan 48823.



First year medical students receive briefing and review on surgical procedures with the rear screen Mark IV Fairchild projector. This sound-on-film machine has gained wide popularity in Medical Education.



Fairchild Mark V, R8 projector and separate speaker with 30-minute, sound-on-film cartridge in load position. The Mark V is intended for front projection.

This, it seems to me, is a realistic hope since the equipment and films should be in nearly constant use once purchased. That is what accessibility means in this context—*frequent* and *instantaneous* use. With that kind of utilization, both equipment and films will wear out more quickly than with present 16mm systems and there will be the opportunity to replace both the materials and equipment more frequently with improved models. An anology might be drawn here with computer technology which would still be back in the days of Illiac if people had not been willing to make purchases in the face of knowing that any one model would be obsolete as soon as it was installed, if not when the order for it was signed.

The message, then, is to *use* the medium. One might say make it PURR:

P -- preview-prescribe-purchase
U -- use (unceasingly and ubiquitously)
R -- review-reevaluate
R -- repurchase or reselect

Some of the material in this article is drawn from research done by the Single Concept Film Clip Project pursuant to a contract with the United States Office of Education, Department of Health, Education and Welfare, under the provisions of Title VII of the National Defense Education Act.

New Machines, How About Films?

by Charles G. Bollmann, Asst. Director
SCFCP Michigan State University
Photos by Paul Nelson, IMC, MSU staff.

THERE HAS BEEN tremendous growth in the use of single-concept, closed-loop film in the last five years. Much of this development can be attributed to the low-cost Technicolor 8mm projector. Even though there are now over 3000 titles available in Technicolor cartridges alone, real mass application of the single-concept idea seems to have been waiting for the appearance of similar machines with sound track capability.

It seems quite certain that several new 8mm sound-on-film cartridge projectors will be on the market by the fall of 1966. Although these new machines are likely to be less expensive than anything with similar capabilities which is now available, their initial price probably will not be in the $150-200 price level, the range supposedly necessary for really wide-scale application. This then generates a dilemma: A price breakthrough needs high volume and high volume needs a price breakthrough.

High volume of sales of the new projectors will depend in part on the availability of compatible films; at the same time producers are reluctant to produce much film for the machines until a significant number of them have been sold. Thus, another dilemma is posed: Breadth and depth of film offerings depends on availability and cost of films.

Film Clip Solution

Procedures developed in a two-year U.S. Office of Education (USOE) sponsored research project at Michigan State University may help to solve these dilemmas. Although the Single Concept Film Clip Project will not submit its final report until July, some of its findings can be applied now to the problems raised above. The project has successfully demonstrated that so called single concept segments of film can be identified within existing 16mm films, excerpted, editorially treated, put into some other format (super 8mm, for example) and used within various instructional contexts.

Other findings of the project, which support many of our original hypotheses, and which bear on this matter, are: 1) Excerpting does not improve poor films and does not weaken good films.

2) Excerpting should be done by experienced teachers who have real competence in the discipline dealt with in the film content.

3) Sound films are more economically productive for sound excerpts because changing them to silent versions usually requires extensive editing.

Although excerpting films has other legitimate advantages, the availability of already-captured visual images (especially now that excerpting for sound is feasible), offers the chance to produce short, single concept films quite inexpensively. Much of the production cost of existing 16mm footage has already been amortized, so producers could break the market open by adding only modest profit margins to the costs of raw stock, excerpting, printing, and distribution. Their real reward lies in the potential volume of such short films.

Cost, Important Factor

The average cost today of 8mm footage (silent) in Technicolor cartridges is about $5 per minute. Although this is about half the cost of 16mm color-sound film, it is still roughly ten times the cost of color, sound filmstrips. With the excerpting process advocated here, it should be possible (keeping high volume in mind) to add sound and cut the cost per minute of 8mm loops. If, for example, it could be brought down initially, say, to $3 per minute, the snowball may start rolling and once it gets rolling, volume and price should continue to feed each other until a very low price per minute is realized. And once a high-volume market has been established, it should be possible to offer new "start-from-scratch" productions at or near the same low price.

The problems and cost of producing excerpts from existing footage should not be minimized. However, these factors are far from being unsurmountable. Producers who are willing to take a little risk can perform a substantial service to education by using the excerpting method to produce high-quality film loops. Then excerpting will fulfill the function originally seen for it, that of being an interim step in the development of single-concept, one idea films. The sooner excerpting procedures are started the sooner the dilemmas will be solved and films will be ready for the new educational market.

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SINGLE CONCEPT FILMS

Prepared by the staff of the:

Single Concept Film Clip Project - Instructional Media Center

Michigan State University - East Lansing, Michigan

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July 20, 1966

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